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COAL GASIFICATION EMPLOYMENT
OPPORTUNITIES FOR RESIDENTS
OF THE OLD WEST REGION

Volume II - Appendices

April 15, 1974

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APPENDIX A

Manning Table From Petroleum Refinery

APPENDIX A

MANNING TABLE FROM PETROLEUM REFINERY

Refinery Manager

- Deputy Refinery Manager
 - Environmental Control Manager
 - Environmental Staff Engineer
 - Environmental Surveillance Supervisor
 - Environmental Inspectors - 5
 - Environmental Design Supervisor
 - Assistant Engineers - 2

Accounting Department Manager

- Management Information Supervisor
 - Senior Accountant
 - Cost Accountants - 2
 - Data Processing Supervisor
- General Accounting Supervisor
 - Senior Timekeeper
 - Timekeeper
 - Supervisor, Systems & Office Services
 - Telephone Operator/Receptionist
 - Keypunch Operator
 - Mail Clerk
 - Sr. Steno-Clerk
 - Clerk Typist
 - Fixed Asset & Job Order Analyst
- Yield Accountant
 - Yield Clerk
 - Senior Shipping Clerk
 - Shipping Clerk
- Purchasing Representative
 - Senior Buyer
 - Buyer
 - Purchasing Clerks - 2
 - Steno-Clerk

Employee Relations Department Manager

- Medical
- Sr. Secretary
- Ass't Employee Relations Manager
 - Employee Relations Clerk
 - Steno-Clerks - 2
- Fire & Safety Manager
 - Plant Security Contract
 - Chief Fire & Safety Inspector
 - Fire & Safety Inspectors - 3
- Employee Relations Assistants - 2

Maintenance Department Manager
Assistant Maintenance Manager - Shops
Maintenance Shops Clerk
Electrical Supervisor
 Sr. Electrical Foreman
 Electrical Foremen - 5
 Contract Electricians
Master Mechanic
Preventive Maintenance Supervisor
Machine Shop Supervisor
 Machinists - 27
Heavy Trades Supervisor
 Boiler Shop Foreman
 Welder Foreman
 Boilermakers - 19
 Laborers - 2
 Pipefitters - 26
 Tool Room Men - 6
 Welders - 12
Instrumentation Supervisor
 Senior Instrumentation Foreman
 Instrumentation Foreman
 Instrumentation - 19
 Instrument Technician
Soft Trades Supervisor
 Soft Trades Foreman
 Carpenters - 14
 Insulators - 4
 Painters - 3

Assistant Maintenance Manager - Zone 1
Maintenance Supervisor
Maintenance Foreman as Assigned from Pool
 Craftsmen as Assigned from Pool
Machinist Supervisor
 Machinist Foreman
 Machinists as Assigned from Pool

Assistance Maintenance Manager - Zone 2
Coker Maintenance Supervisor
 Coke Hdlg. Lead - 5
 Coke Cutter - 13
 Clara Operators - 5
 Cleanout Men - 25
Maintenance Foremen as Assigned from Pool
 Craftsmen as Assigned from Pool
Machinist Supervisor
 Machinist Foreman as Assigned from Pool
 Machinists as Assigned from Pool
Labor, Pollution Control & O.S.H.A. Foreman
Maintenance Supervisor
 Maintenance Foreman as Assigned from Pool
 Craftsmen as Assigned from Pool

Assistant Maintenance Manager - Planning & Warehouse
Project Supervisor
Maintenance Foremen as Assigned from Pool
Craftsmen as Assigned from Pool
Project Clerk
Transportation Supervisor
Rigging Foreman
Auto Mechanic - 1
Gang Boss - 4
Mat. Del. Men - 3
Riggers - 7
Truck Drivers - 6
Maintenance Planning Supervisor
Turnaround Maintenance Planners - 2
Maintenance Planners - 2
Assistant Maintenance Planner
Planning Assistant
RWO & Scheduling Clerk
Plan. & Comm. Clerk
Maintenance Clerk
Building Maintenance Contract
Head Custodian
Sr. Maintenance Foremen - 6
Maintenance Foremen - 8
Warehouse Foreman
Lead Warehouse Clerk
Warehouse Clerk
Warehousemen - 5
Maintenance Staff Assistant

Operations Department Manager
Schedule Clerk
Assistant Schedule Clerk
Assistant Operations Manager - Zone A
FCC Complex Supervisor
Stillman A - 10
Stillman B - 29
Special Assignment Ass't Sr. Engineer
H₂, C₂ & PtR's Supervisor
Stillman A - 13
Stillman B - 17
Ass't Stillman - 4
Sulfur Complex Supervisor
Stillman A - 7
Stillman B - 5
Ass't Stillman - 4
Utilities Supervisor
Stillman A - 1
Stillman B - 4
Ass't Stillman - 4



Operations Department Manager (Cont'd)

Assistant Operations Manager - Zone B

Crude Complex Supervisor

Stillman A - 7

Stillman B - 12

Ass't Stillman - 5

Coker Complex Supervisor

Stillman A - 12

Stillman B - 18

Ass't Stillman - 5

Shift Superintendant - 5

Shift Foreman - 5

Control Room Supervisor - 5

Assistant Operations Manager - Zone C

Treating & Utilities Supervisor

Stillman A - 7

Stillman B - 17

Ass't Stillman - 4

Operations Planning Supervisor

Special Assignment Engineer

Assistant Engineer

Oil Movements Supervisor

Stillman A - 12

Stillman B - 19

Assistant Stillman - 8

Truck Loader - 7

Technical Department Manager

Sulphur Plant Coordinator

Boiler Plant Project Coordinator

Laboratories Assistant Manager

Lab Clerk

Analytical & Gas Labs Supervisor

Sr. Inspector - 4

Lab Technician

Inspector

Chemist - 2

Jr. Chemist

Control & Engine Labs Supervisor

Inspector - 3

Helper B - 5

Senior Inspector - 9

Process Engineering Ass't Manager

Steno-Clerk

FCC Complex Supervisor

Engineer

Assistant Engineer

Utilities Supervisor

Engineer

Assistant Engineer



Technical Department Manager (Cont'd)

Crude Complex Coker Units & Oil Movements

Ass't Sr. Engineer

Engineer - 2

Technical Service Engineer

Refiners & Hydrocracker Complex Supervisor
Engineer

Assistant Engineer

Economics & Planning Ass't Manager

Steno-Clerk

Long Range Planning Engineer

Industrial Engineering Engineer

Short Range Planning Supervisor
Engineer

Linear Program Activity

Ass't Sr. Engineer

Technical Ass't

Mechanical Engineering Ass't Manager

Steno-Clerk

Electrical & Instrumentation Supervisor

Instrumentation Ass't Sr. Engineer

Engineer - 2

Electrical Engineer

Project Engineering Supervisor

Senior Engineer

Assis't Sr. Engineer

Engineer - 2

Ass't Engineer - 2

Corrosion & Maintenance Inspection Supervisor

Inspection Pressure Equipment Inspector - 2

Ref. Equipment Inspector - 3

Inspection Clerk

Corrosion Engineering Ass't Sr. Engineer

Maintenance Engineering Ass't Engineer - 2

Computer Section Ass't Manager

Systems Supervisor

Programmer

Jr. Programmer

Process Control Supervisor

Assistant Engineer - 2

Assistant Sr. Engineer

Assistant Engineer



APPENDIX B

Descriptions of Petroleum Refinery and Mining Occupations

APPENDIX B

DESCRIPTION OF PETROLEUM REFINERY OCCUPATIONS*

BLENDER. gasoline finisher; lead blender. Controls equipment to blend straight run or natural gasoline with chemicals, tetra-ethyl leads, and light distillates of crude oil to produce commercial fuel, according to formula: Reads blending schedules specifying components and quantities to be blended. Turns controls to open valves and starts pumps or notifies PUMPMAN I to transfer gasoline to blending tanks. Computes amount of additives or sets weighing machine that automatically weighs quantities of additives in ratio to quantity of gasoline. Turns handwheels to open valves and spray jets to admit and circulate specified quantities of gasolines, additives, and chemicals in mixing tanks. Moves controls of pumps, agitators, and mixers to blend mixture mechanically or with air agitation. Observes temperature gages and turns valves to regulate and maintain specified temperature in tanks. Draws sample of mixture for laboratory analysis. Repeats blending process as required by laboratory recommendations, or starts pumps to draw off blended gasoline to storage tanks or leading racks. Opens valves to draw off chemical and lead residue. Records quantity blended and materials used. Lubricates, adjusts, and repairs pumps, agitators, and mixers. May test products [TESTER]. May operate control panel, utilizing electronic computers and controls, to blend products in pipelines (in-line blending). May be designated according to type of additive as ETHYL BLENDER.

ASPHALT BLENDER. Blends asphalt with products, such as naphtha, kerosene, distillates, and additive agents, according to specifications, to improve its quality, viscosity, and performance.

COMPOUNDER. Controls equipment to blend industrial, automotive, and special lubricating oils with other oils and with chemical additives, such as antioxidants, corrosion inhibitors, detergents, dispersants, pour point depressants, foam inhibitors, and viscosity index improvers, to improve quality of oil according to specifications. May be designated according to type of oil blended as LUBE-OIL COMPOUNDER.

BLENDER HELPER. compounder helper. Assists BLENDER in blending, loading, and weighing powdered plastic materials: Transports materials from storage areas, using handtruck. Cuts baled materials, such as butyl rubber, into chunks on mechanical press. Weighs materials on platform scales and records weights. Loads materials in bags or in tubs on conveyor to transport them to blending machine. Raises and transports drums of liquid ingredients, such as oils, using hoist. Empties drums, using bung wrench, and turns valves to admit liquid ingredients into tanks. Opens sacks with knife and empties dry materials, such as clay or carbon black, into blending machine. Presses buttons to start agitator. Performs other duties as described under HELPER.

*as defined in Dictionary of Occupational Titles, 1965, Vol. 1

CARGO INSPECTOR. dockman. Inspects crude and refined petroleum before and after transfer from terminal tanks to ship tanks, to determine if it meets prescribed standards: Lowers sample container into ship tanks to obtain sample of oil residue and into terminal tanks to sample oil; or opens bleeder valves on pipelines to obtain sample. Determines amount and type of bottom sediment, water, and foreign substance present in oil sample, using centrifugal tester and following standard formulas. Lowers thermometer into tanks to take temperature reading and determines quantity of oil in ship tanks, using calibrated tape and conversion tables. Records test results. Turns valves to close tanks, inspects valves for leaks, and clamps seal around valves to secure tank contents. Prepares, verifies, and examines cargo landings, oil transportation records, and export records.

CAR INSPECTOR. tank-car inspector. Inspects and repairs refinery tank cars: Examines wheels, bearings, brakes, and safety appliances for defects. Replaces defective brakerod pins, tightens safety appliances, and packs bearings with grease. Examines valves, plugs, and tank seams, and seals leaks, using calking compound.

CATALYST OPERATOR, GASOLINE. Controls machines which combine ingredients, such as sodium silicate, sulfuric acid, water and caustic soda, to make catalysts used in manufacture of high octane gasolines. Dumps dry ingredients into electric mixing vats and turns valves to admit prescribed amounts of liquid ingredients. Observes thermometers and flowmeters and controls temperature and amount of flow by adjusting gages. Turns valves to allow mixture to flow from mixing vats to vacuum filters to remove excess water. Controls pumps which force mixture through spray-dryers where particles of catalyst are formed and regulates temperature and speed of spray by turning dials on control panel. Controls pumping of catalyst particles from bottom of dryers to washer-filters for removal of cation and anion impurities. Turns valves to regulate flow of catalyst through hot-air-steam dryers and observes temperature and speed of flow to insure proper drying. May draw off samples of mixture for analysis. May keep records of batches processed.

CATALYST-OPERATOR HELPER, GASOLINE. Assists CATALYST OPERATOR, GASOLINE in mixing and drying ingredients used to produce or recondition catalysts: Loads materials into mixing tanks, places pans in driers, and empties dried material into containers on scale. Labels and removes containers to process or storage areas. Performs other duties as described under HELPER (any ind.).

CHEMICAL OPERATOR II. reactor operator. Tends equipment units or semiautomatic system that processes chemical substances into industrial or consumer products, such as detergents, emulsifiers, salts, bleaching agents, acids, and synthetic resins: Dumps specified amounts of solid materials into heating vessels or blending tanks, and turns valves to feed liquid and gaseous materials through equipment units or sets controls in specified sequence on control panel

to start automatic feed. Turns valves or moves controls to maintain system at specified temperature, pressure, and vacuum levels. Observes chemical reactions, monitors gages, signals, and recorders, and receives notification from control laboratory, supervisor, or other workers to make specified operating adjustments. Draws samples of products for laboratory analysis. Maintains logs of gage readings and shift production. May perform chemical tests on product to insure conformance with specifications, using standard test equipment, materials, and procedure.

ALKYLATION TOWERMAN. Tends semiautomatic acid contactors (reactors), debutanizers, deisobutanizers, depropanizers, and fractionation towers to facilitate production of alkylates (saturated isoparaffins) used in high-octane gasolines.

CHEMICAL OPERATOR III. reactor operator. Controls equipment units or system that processes chemical substances into specified-industrial or consumer products, according to knowledge of operating procedures and chemical reactions, laboratory test results, and correlation of process instrumentation: Reads plant specifications to ascertain product, ingredients, and prescribed modifications of plant procedures. Starts automatic feed of solid or semisolid materials through equipment units, such as heating vessels and mixing tanks, or dumps preweighed ingredients into tanks, hoppers, or onto conveyor. Moves controls to regulate feed of liquids and gases through equipment in specified timing and sequence, or starts automatic feed. Sets up and adjusts indicating and controlling devices, such as gas analyzers, recording calorimeters, and radiographic detecting or gaging instruments to facilitate simultaneous analysis and control of process conditions. Observes gages, signals, and recording instruments, turns valves, and moves controls to regulate temperatures, pressures, and flow of steam, coolant, and chemical constituents through system to effect prescribed reaction within critical limits, according to knowledge of equipment and process. Draws samples of product at specified stages of synthesis, and performs litmus, titration, refractometer, gas-analyses, or other standard tests to determine if reaction is proceeding efficiently and in conformity with plant standards. Observes color or consistency of product through sight glasses, and correlates observations with test results, laboratory analyses, and instrument readings to facilitate regulation of process and production of standardized product. Maintains log of gage readings, shift production, and equipment malfunctions.

ALKYLATION OPERATOR. Controls semiautomatic alkylation unit consisting of acid contactors (reactors), debutanizers, deisobutanizers, depropanizers, and fractionation towers with such auxiliary equipment as chillers, reboilers, coolers, condensers, heat exchangers, caustic and water wash systems, pumps, and compressors, to form alkylates (saturated isoparaffins) used in high-octane gasolines.

CHEMIST HELPER, PETROLEUM. laboratory-inspector helper; student assistant; tester assistant. Performs chemical tests under direction of CHEMIST, PETROLEUM (profess. & kin.) on materials, such as petroleum or coal tar, to provide data to processing-unit operators for controlling the distillation and treatment of material according to standards: Assembles and prepares equipment, such as flasks, retorts, agitators, columns, condensers, filters, pyrometers, thermometers, burners, and molds. Tests materials by distillation, filtration, purification, titration, extraction, or fractional distillation. Collects samples of products and tests them for specific gravity, viscosity, and asphalt penetration. Tends equipment, such as hotplate, Bunsen burner, electric furnace, and electric oven to dry or treat materials. Calculates percentages of ingredients in mixture and records information in log. Washes bottles and laboratory equipment.

CLAY ROASTER. burner; burner man; burner operator; clay burner; earth burner. Tends clay roasting kilns and auxiliary equipment in which clay, used as filter in treating oil, is cleaned and treated for reuse. Adjusts temperature of rotary kilns in which clay is roasted, by regulating valves controlling the gas or oil and air supply. Starts, stops, and regulates speed of conveyors and elevators by which used clay is charged into kilns from storage bins. Fires oil-burning or gas-burning steam heater to supply steam for treating clay before it is dumped from filters. Checks weight per cubic foot of clay to determine whether it conforms to requirements, using an ordinary spring balance. Cleans lumps of fused clay from screens at outlet of kilns. Oils and greases equipment.

WEDGE-FURNACE KILNMAN. Tends type of kiln known as wedge furnace, in which clay, used to treat lubricating oil to remove impurities and improve its color, is roasted for reuse.

CONSTRUCTION-AND-MAINTENANCE INSPECTOR. Inspects petroleum-dispensing equipment and machinery at wholesale distributing plants of refinery for defects: Operates air-elimination, crane-like, and pumping equipment to detect malfunctions. Pumps petroleum from storage tanks into calibrated cans or tests tank trucks to verify accuracy of recording meters. Compiles reports of inspection data.

CONTROL MAN. houseman; operator, control room. Operates control panel to regulate temperature, pressure, rate of flow, and tank level in petroleum refining, processing, and treating units and petro-chemical units, according to process schedules: Observes instruments and meters to verify specified conditions and records readings. Moves and adjusts dials, switches, valves, and levers on control panel to regulate and coordinate process variables, such as flows, temperatures, pressures, vacuum, time, catalyst, and chemicals as specified. Reports malfunctioning equipment to STILLMAN. Records results of laboratory analysis. May test products for chemical characteristics and color, or send them to laboratory for analysis. May change recording charts and ink pens [CHART CHANGER (clerical)]. May operate auxiliary equipment to assist in distilling



or treating operations. May lubricate equipment. May be designated according to type of unit or process as CONTROL MAN, CRACKING UNIT; CONTROL MAN, CRUDE UNIT; CONTROL MAN, POLYMERIZATION UNIT; SOLVENT-TREATING-PLANT CONTROL MAN.

DISPATCHER, CHIEF I. chief dispatcher. Plans schedules and prepares operating procedures to direct movement of gas, crude oil, or petroleum products through pipelines from point of origin to distribution points or destinations: Contacts buyers or shippers and prepares and coordinates oil and gas delivery schedules to meet contract stipulations or reviews gas consumption records, forecasts of consumer demands and estimates of peak deliveries to determine quantities and pressures and volumes of gas to be directed through or maintained in pipelines. Schedules movement of petroleum products to minimize contamination among products. Prepares operating schedules for compressor or pump stations, tank farms, refineries, and gas or oil wells, as to type and quantities of crude oil, gasoline, fuel oil, kerosene, and gas to be moved, time of movement and deliveries, pressures and volumes to be maintained, and destinations specified. Issues instructions on gaging, switching, sampling, and testing oil and gas. Reviews reports of receipts, movements, withdrawals, deliveries, pressures, and storage stocks, and examines operating reports to insure safe operation of pipelines. Determines conditions that warrant shutdown and repair of equipment. Prepares emergency operating procedures to maintain schedules, flows, volumes, and pressures, and to recover losses resulting from breakdown of equipment. May communicate with field personnel, using teletype or telephone. May be designated according to type of product as DISPATCHER, CHIEF, GAS; DISPATCHER, CHIEF, OIL.

DISPATCHER, CHIEF II. district superintendent, gas and gasoline; general-office dispatcher; superintendent, pressure. Coordinates activities of GAS DISPATCHER (light, heat, & power; petrol. production; petrol. refin.) to deliver natural gas from oil fields through pipelines to delivery points: Reviews customer purchase requests to gather information for scheduling gas movements from various fields. Prepares schedules and notifies GAS DISPATCHER (light, heat, & power; petrol. production; petrol. refin.) by radio, teletype, or telephone to release specific amount of gas from well. Reviews periodic reports of gas pressures and volume of gas delivered to insure safe operation of pipelines. Keeps records of deliveries of gas, pressures maintained, and shutdowns of lines. May coordinate transfer of liquid petroleum products by pipeline.

DISPATCHER, OIL. Directs and coordinates field activities of workers who route and control flow of oil and petroleum products through pipelines from point of origin, such as wells and storage tanks, to delivery points, such as terminals, carriers, refineries, and tank farms, according to delivery schedules: Reviews oil movement schedules and notifies field personnel, such as DISPATCHER, RELAY (pipe lines); STATION ENGINEER, MAIN LINE (pipe lines); and GAGERS, by teletype, telephone, and field radio, as to type and

quantities of oil to be moved, facilities and storage stock to be used, destinations, operating procedures, and pumping and delivery schedules. Studies data on oil and oil movement, such as temperatures, pressures, specific gravities, sediment and contamination content, and pumping rates, and insures compliance with schedules and contract specifications by dispatching instructions to field personnel to increase or decrease pumping rates and pressures, to switch and inject feeder streams of crude and blend oil, and to gage and test oil. Compares pumping reports with delivery reports to ascertain quantity of oil delivered. Computes data for production reports and for instruction changes relative to pumping rates and pressures, using calculator and slide rule.

DRAFTSMAN, OIL AND GAS. Drafts plans and drawings for layout, construction, and operation of oil fields, refineries, and pipeline systems from field notes, rough or detailed sketches, and specifications: Develops detail drawings for construction of equipment and structures, such as drilling derricks, compressor stations, gasoline plants, frame, steel, and masonry buildings, piping manifolds and pipeline systems, and for manufacture, fabrication, and assembly of machines and machine parts.

ELECTRICAL REPAIRMAN. Repairs, maintains, and installs electrical systems and equipment, such as motors, transformers, wiring switches, and alarm systems: Locates and determines electrical malfunction, using test instruments, such as ammeter, oscilloscope, and test lamp. Repairs malfunction by such methods as replacing burnt-out elements and fuses, bypassing or replacing defective wiring, filing switch contact points, and cleaning or rewiring motors, using handtools. Tests electrical equipment, such as generators and heaters for safety and efficiency, using standard test equipment, and by observing functioning. Installs fixtures, motors, and other electrical equipment. Makes equipment adjustment, using handtools. Inspects circuits and wiring for specified shielding and grounding and repairs or rewires system according to building codes and safety regulations. May replace bearings in electric motors. May repair mechanical, pneumatic, hydraulic, or electronic components of electrical equipment, using standard tools, gages, and procedures.

FIELD-MECHANICAL-METER TESTER. mechanical meter tester; meter inspector. Installs, tests and maintains mechanical metering, regulating, indicating, and testing instruments and equipment used in production and distribution of fuel gas: Tests, installs, and maintains gas, steam, and water instruments and apparatus, such as meters, governors, calorimeters, flow-meters, and pyrometers used in gas generating plants, holders, and distribution lines [GAS-GOVERNOR REPAIRMAN]. Installs, tests, and maintains mechanical testing equipment, such as gas provers. Conducts special physical tests on gas, steam, and water. Correlates test data, performs technical calculations, and writes reports.

FIREMAN. Controls operation of burners to maintain temperature in furnaces of petroleum processing units according to specifications: Observes temperature, pressure, and flow gages to verify operating conditions of unit and records data. Starts furnace and regulates temperature, by turning valves and switches to increase or decrease flow of fuel oil or gas to burner and of oil to still, according to processing schedule. Throws switches to place burner on automatic control. Examines furnace to detect overheating of walls and tubes, and leakage of still bottoms or oil tubes. Observes flame distribution and combustion conditions in furnace, color of burner flame, and gas issuing from stack, and moves air damper control to correct combustion conditions and stop flame impingements. Reports irregularities in operation to STILLMAN. May remove and clean burners with hand-tools, brusher, solvent, or steam.

FIRE MARSHAL. fire chief. Supervises and coordinates activities of firefighting personnel of industrial establishment and inspects equipment and premises to insure adherence to fire regulations: Inspects and orders replacement or servicing of firefighting equipment, such as sprinklers and extinguishers. Issues permits for storage and use of hazardous or flammable materials. Orders and directs fire drills. Directs firefighting and rescue activities according to knowledge of accepted procedures. May be designated according to employing establishment as FIRE MARSHAL, REFINERY.

FOREMAN, DEHYDROGENATION. catalyst foreman; dehydrogenation operator, head. Supervises and coordinates activities of workers engaged in operation of preheat furnaces, catalytic-reactors, quench and stripper towers, absorbers, stabilizer, re-run continuous stills, and auxiliary equipment, such as inert-gas generating system, condensers, heat exchangers, pumps, compressors, and blowers to produce petrochemicals such as butadiene, styrene, butylene, and ethylbenzene: Trains workers in operation of equipment. Coordinates operation of various units in system to assure required production yields, referring to run sheets, test books, order books, log books, and pumping records. Observes recording-instrument charts, flow meters, and gages to verify conformity of temperatures, pressures, flow rates, and liquid levels to process specifications. Correlates instrument readings and test results to diagnose process malfunctions. Inspects equipment and cathodic-protection system to detect defects and malfunctions. Performs other duties as described under FOREMAN. May be designated according to product as BUTADIENE OPERATOR, CHIEF; ETHYLBENZENE-CRACKING FOREMAN; STYRENE OPERATOR, CHIEF.

FOREMAN, DOCK. dock foreman; terminal foreman; wharfman, head; wharf tender, head. Supervises and coordinates activities of workers involved in loading and unloading crude oil and liquid and packaged petroleum products, such as gasoline, kerosene, fuel oil, motor oil, and grease into and from barges, ships, or tankers at marine terminal: Receives instructions pertaining to vessel movements, types and quantities of crude oil and petroleum products to

be received or delivered, facilities to be used, and loading schedules. Orders GAGERS to open or close pipelines and tank valves to control and divert oil flow and to gage and sample oil. Reads gaging and pumping reports and bills of lading to verify receipt or delivery of specified products. May supervise workers engaged in loading and unloading tank cars and trucks, and receiving, storing, and issuing petroleum products [LOADING-RACK FOREMAN]. Perform other duties as described under FOREMAN.

FOREMAN, MAINTENANCE. gang boss; gang pusher; maintenance foreman. Supervises and coordinates activities of workers engaged in construction, maintenance, and cleaning activities at petroleum refinery. Performs duties as described under FOREMAN. May supervise workers engaged in cleaning stills, storage tanks, and distillation towers only and be designated FOREMAN, TANK CLEANING.

FOREMAN, NATURAL-GAS PLANT. plant foreman. Supervises and coordinates activities of oilfield workers operating equipment, such as compressors, boilers, pumps, and dehydration vessels to remove sediment and water from crude oil, extract natural gas, and separate natural gasoline from gas by means of heat, pressure, and chemical action. Orders flow cycles, pressures, and temperatures of petroleum to be maintained, according to process involved and properties of petroleum being processed. Performs duties as described under FOREMAN.

FOREMAN, PURIFICATION. chief operator; chief operator, hydroformer; extraction foreman; fractionation foreman; fractionation operator, head. Supervises and coordinates activities of workers engaged in operating superfractionation towers, absorbers, stabilizers, rerun towers, naphtha-desulphurizing units, caustic wash units, separators, catalytic reactors, furnaces, stripper towers, and auxiliary equipment, such as pumps, engines, and compressors to separate light naphtha blends from crude naphtha, compound hydroformates from light naphtha, and extract products, such as benzene, toluene, and xylene from hydroformates: Coordinates operation of various units in system, according to run sheets, test books, order books, log books, gage sheets, and pumping reports. Observes recording-instrument charts, flowmeters, and gages to verify specified temperatures, pressures, flow rates, and liquid levels. Correlates instrument readings and test results to diagnose process malfunctions. Inspects equipment and cathodic-protection system to detect defects and malfunctions, such as excessive wear, overheating, and leaks. Directs workers in spraying catalyst beds with steam to regenerate catalyst. Trains workers in procedures for correcting malfunctions in equipment. Prepares bills of lading and manifests, inspects tank cars and tank trucks for cleanliness, and directs loading of cars and trucks to ship product. Performs other duties as described under FOREMAN. May be designated according to product as BENZENE-REFINING FOREMAN.

FOREMAN, SALVAGE. reclamation foreman; salvage foreman. Supervises and coordinates activities of workers engaged in salvaging valves, flanges, pipe fittings, tubes, and traps, and in sorting, storing, and issuing reclaimed articles. Determines salvability of defective parts, based on knowledge of availability and cost of replacements. Performs duties as described under FOREMAN.

FOREMAN, SPECIALTY PLANT. loading foreman. Supervises and coordinates activities of workers engaged in blending, compounding, packing, loading, and shipping special petroleum products, such as asphalt paints, paint primer, mastics, and lighter fluid: Confers with department heads to coordinate work of department with sales, billing, and other refinery activities. Plans blending schedules to maintain stock of standard products and computes blends from standard formulas. Writes shipping orders for loading tank cars and trucks. Performs other duties as described under FOREMAN.

FOREMAN, TOWER. Supervises and coordinates activities of workers engaged in operation of stills and related units, such as absorbers, debutanizers, catalyst hoppers, reboilers, heat and vapor exchangers, desalters, clay towers, stabilizers, furnaces, strippers, and de-sulfurizers, in which crude oil and resultant distillates are processed to separate and recover various petroleum products. Confers with GENERAL MANAGER, REFINERY AND CHEMIST, PETROLEUM to plan production schedules and to determine temperatures, pressures, rates of flow, and tank levels required for control of process. Directs refining operations in assigned units through STILLMEN. Reviews recording instrument and flow meter charts, log sheets, and laboratory analysis reports to verify control of process. Performs other duties as described under FOREMAN.

FOREMAN, TREATING AND PUMPING. Supervises and coordinates activities of workers engaged in treating petroleum products with chemicals, steam, water, or air to remove sulfur and other impurities, in blending products to specification, and in pumping products to storage tanks, loading racks, and other processing units: Inspects treating and pumping units to verify specified temperatures and pressures. Reads log sheets, gaging records, and laboratory test reports to verify conformity of product to production schedules and specifications. Performs other duties as described under FOREMAN.

GAGER. field gager; pipe-line gager; tank-farm gager; terminal gager. Gages amount of and tests oil in storage tanks, and regulates flow of oil into pipelines at wells, tank farms, refineries, and marine and rail terminals, following prescribed standards and regulations: Gages quantity of oil in storage tanks before and after delivery, using calibrated steel tape and conversion tables. Lowers thermometer into tanks to take temperature reading. Turns bleeder valves or lowers sample container into tanks to obtain oil sample. Tests oil to determine amount of bottom sediment, water, and foreign materials, using centrifugal tester, calculating

results by means of standard formulas. Records readings and test results. Starts pumps, and turns handwheels to open and close valves on pipelines and tanks to regulate and direct flow of oil from and into tanks, according to delivery schedules. Reads automatic gages at specified time intervals to calculate flow rate of oil into or out of tanks and amount of oil in tanks. Inspects pipelines, valves, and flanges to detect loose connections, leaks, and malfunctioning. Tightens connections with wrenches, greases and oils valves, using grease gun and oilcan, and reports leaks or defective valves. Clamps seal around valves to secure tanks. May operate pumps, teletype, and mobile radio. May clean pumps, machinery, and equipment. May issue delivery or receiving tickets. May record meter and pressure readings at gas wells.

GAGER, CHIEF. chief gager; district gager. Supervises and coordinates activities of GAGERS controlling flow of oil into pipe lines and gaging amount of oil stored in tanks or railroad cars. May oversee loading and shipment of oil and preparation of loading reports and bills of lading. Performs duties as described under FOREMAN.

GAS-COMPRESSOR OPERATOR. gas-lift engineer. Operates steam or internal combustion engines to transmit, compress, or recover gases, such as butane, nitrogen, hydrogen, and natural gas, in various production processes: Moves controls and turns valves to start compressor engines, pumps, and auxiliary equipment. Monitors meters, gages, and recording instrument charts to insure specified temperature, pressure, and flow of gas through system. Observes operation of equipment to detect malfunctions. Records instrument readings and operational changes in operating log. May operate purification tanks (scrubbers) to purify air or byproduct gases. May tend pumps to mix specified amounts of acids and caustics with water for use in purifying gases. May be designated according to type of gas compressed or recovered as BUTANE-COMPRESSOR OPERATOR.

GAS-GOVERNOR REPAIRMAN. Tests, repairs, and adjusts regulators (gas governors), relief valves, and related equipment used to control gas pressure in city gas mains and service pipes, pipelines, in-plant gas systems, and petroleum refineries: Dismantles regulator and examines such parts as springs, valves, and diaphragm for wear or deterioration. Cleans corrosion and tar deposits from serviceable parts, using solvents and wire brush. Cuts seat to receive new orifice, taps inspection ports, and performs other repairs to salvage usable materials, using handtools and machine tools. Reassembles regulator with new and reconditioned parts according to blueprints. Connects regulator to test stand and turns screw adjustment until test-stand gages indicate regulator inlet and outlet pressures are according to specifications for regulator and type of service. Tests and adjusts pressure setting of relief valves in similar manner. Records work done, pressure adjustment, and related data for each instrument. May install regulators and such related equipment as gasmeters, odorization units, and gas-pressure-telemetering equipment.



GAS-GOVERNOR-REPAIRMAN HELPER. gas-regulator-repairman helper. Assists GAS-GOVERNOR REPAIRMAN in repair and installation of regulators: Dismantles and cleans regulators preparatory to repair. Performs regulator pressure-tests as directed. Cuts, threads, and joins pipe sections and fittings to fabricate pipe assemblies to be installed in regulating stations by other workmen. Drives truck to haul tools and equipment to regulator station. Performs other duties as described under HELPER.

GREASE MAKER. Controls gas or steamheated kettles to produce various grades of lubricating grease: Pours specified quantities of ingredients, such as melted fats, mineral oils, and soda or lime base into kettle and starts agitator to stir mixture to required consistency. Adjusts kettle temperature controls to form basic soap from mixture. Turns off heat and adds water, dye, and various mineral oils to soap in designated proportions for emulsification. Stirs and reheats mixture to produce grease of required texture.

GREASE MAKER HEAD. foreman, grease-making. Supervises and coordinates activities of GREASE MAKERS engaged in producing various grades of lubricating grease, performing duties as described under FOREMAN.

INDUSTRIAL-TRUCK OPERATOR. Drives gasoline- or electric-powered industrial truck or tractor, equipped with forklift, elevating platform, or trailer hitch, to push, pull, lift, stack, or tier merchandise, equipment, or bulk materials in warehouse, storage yard, or factory: Moves levers and depresses pedals to drive truck and control movement of lifting apparatus. Positions forks or lifting platform under loaded pallets, skids, or boxes, or hooks tow trucks to trailer hitch, and transports load to designated area. Unloads and stacks material by raising and lowering lift forks or lifting platform. May inventory materials on work floor, and supply workers with materials as needed. May lubricate truck, recharge battery, and fill fuel tank. May be designated according to working area as BARREL-HOUSE MAN.

INVENTORY CLERK. Compiles records of amount, kind, and value of merchandise, material, or stock on hand in establishment or department of establishment: Counts stock, material, or merchandise on hand and posts totals to inventory records. Compares inventories taken by other workers with office records or computes figures from sales, equipment, shipping, production, purchase, or stock records to obtain current theoretical inventory. Verifies clerical computations against physical count of stock and adjusts errors in computation or count, or investigates and reports reasons for discrepancies. Compiles information on receipt or disbursement of goods and computes inventory balance, price, and costs. Prepares reports of inventory balance, prices, and shortages. May list depleted items. May recommend survey of broken or unusable items. May operate adding machine and calculating machine. May be designated according to item inventoried as PROPERTY-AND-EQUIPMENT CLERK.

LABORER, PETROLEUM REFINERY. process helper; utility man; yardman. Performs any combination of following tasks in a refinery: Digs ditches, builds dikes and levees, and fills holes with earth, rock, sand, and asphalt gravel, using pick and shovel. Smooths ground surfaces and roadways, using hand tamper. Cleans refining equipment. Removes debris from roadways and work areas, and sprays and hoes weeds. Shovels sand and gravel off vehicles and dumps or shovels cement and sand into mixers. Mixes and pours cement and transports cement in forms with wheelbarrow. Unloads materials, such as tools, equipment, sacks of cement, sand, catalyst, salt, lime, and oil barrels, from freight cars and trucks, manually or with handtruck, and stacks barrels and sacks for storage. Uncrates equipment and parts, such as fractionating or treating towers and bubble trays, using pry bar and hammer, and installs bubble caps, using wrenches. Rips open sacks and dumps chemicals and catalysts into mixing, treating, or storage tanks. Dopes pipelines to prevent corrosion, using doping pot and tar. Changes hoist cables, and rigs chain hoists, rope blocks, power winches, and gin poles used to move or raise equipment. Skims oil from cooling water in water boxes. May be designated according to section of refinery in which work is performed as LABORER, FILTER PLANT.

LEAD-RECOVERY MAN, CONTINUOUS-NAPHTHA-TREATING PLANT. utility man. Operates centrifuge (machine in which solid substance is separated from solution by action of centrifugal force) to recover lead compound used in treating gasoline: Starts pumps to force treating solution into cylinder of centrifuge. Starts machine and allows cylinder to revolve until cake of lead compound has separated from solution. Stops machine if batch-type centrifuge is used, and scrapes cake from cylinder into barrel or if continuous-type centrifuge is used, starts steam pumps to force cake and liquid from cylinder into tanks as separation progresses.

LINE WALKER. line rider; trouble shooter. Patrols oil and gas pipelines and communication systems on foot, horseback, or in automobile to locate and repair leaks, breaks, washouts, and damaged utility wires and poles: Inspects pipelines to detect evidence of leaks, such as oil stains, odors, and dead vegetation. Repairs small leaks, using calking tools, hammers, clamps, and wrenches. Reports large leaks and washouts to district office. Inspects telephone and telegraph wires to locate broken insulators, wires, and fallen poles, and reports findings. Inspects operation of automatic drip bleeder on gaslines to detect clogged valves and malfunctioning, and adjusts or repairs them, using screwdriver and wrenches. Installs and replaces warning signs along road and water crossings. Writes reports of inspection.

LOADING-RACK FOREMAN. loading foreman; rack foreman. Supervises and coordinates activities of workers engaged in loading and unloading petroleum products, such as oils, gasoline, and kerosene, into and from tank cars and trucks: Receives shipping orders and instructions as to type, specification, and volume of material to

be loaded, loading priorities, date of incoming and outgoing shipments, shipping destinations, and availability of storage tanks, tank cars, and trucks. Prepares schedules indicating car numbers and specifications and volume of material to be loaded. Directs workers in spotting and moving tank cars and trucks in yard, in inspecting and cleaning tank cars and trucks, and in loading and sampling petroleum products. Inspects condition of cars or trucks rejected for loading and arranges for their repair or cleaning. Reviews loading and laboratory sample records to verify conformity of load to specifications. Performs other duties as described under FOREMAN.

MANAGER, BULK PLANT. field operating superintendent. Manages plant in which gasoline, lubricants, and petroleum fuels are stored and distributed in bulk lots, formulating policies in regard to storage, distribution, and other operating problems: Determines type and quantities of products according to consumer demand. Contacts refineries and petroleum canning plants to schedule shipment of products. Establishes operating procedures for incoming shipments, indicating storage tanks and warehouse facilities to be used. Formulates policies for distribution and sale of products to wholesale and retail outlets and consumers.

MANAGER, CONTRACTS. supply representative, petroleum products. Engages in negotiations involving representatives of oil producers, refiners, and pipeline carriers to draw up contracts for purchase, sale, or delivery of crude oil, petroleum distillates, and natural gas and gasoline: Analyzes and maintains records of petroleum supply sources, movements of materials from plants to refineries, and current and prospective refinery demands. Coordinates work of sales, production, and shipping departments to implement procurement of products in accordance with refinery needs. Performs liaison work with engineering and production departments concerning contractual rights and obligations. May administer activities of entire department managing contracts or only for specified product, such as crude oil or natural gas. May be responsible for company contracts within specified area or for entire company.

MANAGER, INDUSTRIAL ORGANIZATION. general manager, industrial organization; manager, general; manager, plant; superintendent, industrial organization. Manages industrial organization: Determines and executes administrative policies through subordinate managers. Coordinates activities of departments, such as production, distribution, engineering, maintenance, personnel, and selling. Plans and directs marketing of product to develop new markets and maintain sales volume and competitive position in industry. Plans and develops personnel program to maintain efficient staffing of organization. Reviews and alters programs in areas, such as purchasing, accounting, cost, research and development, and budget allocations, to insure profitable operation of divisions. Represents organization in industry and manufacturing associations to develop acceptance for organization. Typical designation is GENERAL MANAGER.



MECHANICAL INSPECTOR. inspector. Inspects processing and storage tanks, pipelines and fittings, stills, towers, and pumping units for defects following specified inspection procedures: Examines mechanical installations, instrumentation, valves, and fittings for defects, such as cracks, corrosion, and leaks. Measures thickness of tank and tower walls, and pipelines, using calipers and electronic instruments, to determine extent of corrosive damage. Drills test holes in tank and tower walls to take samples of corrosive deposits to verify extent of damage. Installs probes and other instruments in tanks and towers to obtain samples of corrosive deposits and to measure rate of corrosion. Computes rate of corrosion from laboratory analysis of probe samples, using mathematical tables and charts. Reports need for immediate repairs to mechanical department. Prepares inspection reports to indicate nature of repairs and replacements required and to specify safe limits of temperature and pressure to follow pending repair of unit. Inspects new construction and installation of new mechanical equipment for conformity to specifications. May inspect operating condition of firefighting equipment. May be designated according to equipment inspected as STILL-AND-TANK INSPECTOR.

METER-AND-REGULATOR-SHOP FOREMAN. meter-shop foreman; regulator-and-meter-shop foreman. Supervises and coordinates activities of workers engaged in repairing, adjusting, and testing meters, regulators, gages, and recording instruments for measuring and regulating flow of gas, water, and petroleum. Performs duties as described under FOREMAN.

MOLDER, WAX. Tends equipment that molds wax, recovered from processed petroleum, into cakes: Turns valves to fill molds with hot wax. Moves controls to circulate chilling fluid through molds, solidifying wax. Removes wax cakes from molds.

PAINTER, SPRAY II. painter, rough... Performs duties as described under PAINTER, SPRAY I where coating of surface or product is required without need for finished appearance. Workers may spray manufactured articles on assembly line or may travel to work site to spray materials, such as waterproofing, adhesive, or paint onto surfaces of articles. May be designated according to article sprayed as PAINTER, BARREL.

PARAFFIN-PLANT OPERATOR. waxman; wax pumper. Operates filter presses to separate oil of paraffin distillate from paraffin wax: Installs filter plates, using handtools, and turns handwheel to adjust hydraulic ram pressure. Turns valve to regulate flow of chilled distillate into filter plates. Starts machine to activate hydraulic rams that squeeze oil from distillate, as wax solidifies. Observes oil pressed from filter plates and adjusts ram pressure to extract maximum amount of oil from wax. Scrapes accumulated wax from filter plates into spiral conveyor that carries it to melting pan. Turns valve to regulate flow of steam into melting pan to heat wax. Starts pump to return salvaged distillate from tank to filter press for reprocessing. May be designated according to phase of processing as LEAKMAN, PARAFFIN PLANT; PRESSMAN, PARAFFIN PLANT.



PARAFFIN-PLANT-SWEATER MAN. sweater operator; sweat man. Operates sweater unit to separate liquid from slack wax (wax obtained from processed paraffin distillate): Pumps charge of slack wax into sweater tank. Opens valves to circulate cold water through sweater to cool slack wax. Gradually heats (sweats) wax after cooling by opening steam valves to heat water, observing temperature at regular intervals to control process. Turns valves to divert cuts (waxes of different boiling points and specific gravities) to storage tank after completion of each run. Takes samples and observes melting point of each cut at regular intervals. Opens valves to admit steam into sweater tank to melt wax residue when run is completed. Drains melted wax residue from sweater into storage tank.

PILOT-PLANT OPERATOR. Sets up experimental miniature petroleum-refining units to conduct tests for developing and improving methods, products, and equipment: Sets up testing equipment and makes piping hookups to route raw materials and chemicals through processing units. Adjusts valves to regulate temperature, pressure, rate of flow of products through units, and fluid levels in tanks, according to specifications. Observes temperature and pressure gages and charts indicating rate of flow of materials, and records readings. Reports unusual results of tests.

PLANIMETER OPERATOR. Traces boundary lines of land plots on aerial photographs to determine acreage, using planimeter: Centers tracer point of planimeter arm on plot to be measured and places pivot arm at right angle to tracer point. Moves tracer point to starting point on photograph according to shape of area to be measured and traces boundary until point of beginning is reached. Records figures shown on dial and measuring wheels of planimeter at beginning and ending of tracing and subtracts figures from each other to determine acreage.

CHART CLERK. yield clerk. Computes flow of oil or gas by means of charts taken from flowmeters and other recording instruments, using planimeter: Fastens chart to base of planimeter. Guides tracing point of planimeter around periphery of area on chart to be measured. Observes readings and calculates flow, using prescribed formula.

PROCESS-CONTROL CLERICAL SUPERVISOR. Supervises and coordinates activities of personnel concerned with obtaining control data on petroleum refining processes: Directs STOCK CLERKS (clerical) in maintaining stocks of blank charts. Supervises CHART CHANGERS (clerical) in replacing used charts in pyrometers, flowmeters, and other recording instruments. Examines chart recordings to determine if instruments are malfunctioning and reports adjustments needed to instrument-repair department. Informs workers of new instrument installations, readjustment of old instruments, or other factors affecting interpretation of charts. Directs clerical staff in mathematical computations relative to meter recordings. Performs other duties as described under SUPERVISOR

(clerical). May assist in preparation of reports and statements on consumption of utilities.

PRODUCTION SUPERINTENDENT. manager, general; manager, production; plant foreman; superintendent, general. Coordinates, through subordinate supervisors, all activities of production departments or subdivisions, applying knowledge of plant layout, and production capacities of each department: Consults with plant executives and analyzes economic trends, sales, forecasts, and marketing and distribution problems to plan and develop production procedures and time and cost estimates. Interprets company policies and production procedures to subordinate supervisors, and directs their activities. Confers with department heads to formulate programs regarding availability of raw materials, maintenance of plant equipment and physical structure, product quality control, related production records, labor and materials costs, and equipment depreciation, to insure that operating costs are maintained at budgeted level. Reports production figures and job completion dates to plant executives. Originates or assesses measures designed to improve production methods, equipment performance, and quality of product, and recommends changes in working conditions and modifications in machines and equipment. Plans surveys, such as those designed to determine effectiveness of manpower utilization, and projects manpower requirements. Negotiates with workers' representatives in connection with grievance procedures, and reports unsettled grievances to plant executives. In plants having no GENERAL FOREMAN, directly supervises subordinate foreman. Typical designation is REFINERY CHIEF.

PUMPMAN I. process pumper; pumpman, treating; pump operator; still-pump operator. Operates steam- or electric-driven pumps to circulate crude, semiprocessed, and finished petroleum products, water, and chemical solutions through processing, storage, and shipping departments of refinery, according to work orders: Starts pumps in specified units, observes flow and pressure meters, and turns valves and switches to change pumping rates, as directed by PUMPMAN II. Turns handwheels to open or close tank and pipeline valves, manually or using pry bar, to direct flow of products to specified destinations. Observes operation of pumping equipment to detect malfunctioning and leakage. Lubricates cocks, valves, joints, and pumps, using oilcan and grease gun. Tightens bolts and screws to adjust and repair equipment, using handtools. Gages content of tank, using gaging tape. May record operating data, such as products and quantities pumped, stocks used, gaging results, and operating time. May remove sample from tank and test it for specific gravity and color. May repair and overhaul pumps [PUMP SERVICEMAN]. May blend oils or gasolines [BLENDER]. May communicate with PUMPMAN II by radio or telephone to send and receive pumping and gaging information.

COOLING-TOWER OPERATOR. Operates water-cooling system to condense oil vapors or to cool oil during processing. Reads gages to determine temperature of water in cooling system through which oil is flowing. Moves controls to regulate flow of hot and cold water entering system to maintain specified temperature.

PUMPMAN. pumper. Controls pumps and manifold systems to circulate crude, semiprocessed, and finished petroleum products, water, and chemical solutions through processing, storage, and shipping departments of refinery, according to schedules: Reads operating schedules or instructions from DISPATCHER, OIL (petrol. production, petrol. refin.; pipe lines). Plans movement of products through lines to processing, storage, and shipping units, utilizing knowledge of interconnections and capacities of pipelines, valve manifolds, pumps, and tankage. Synchronizes activities with other pumphouses to assure continuous flow of products and minimum of contamination between products. Starts battery of pumps, observes pressure and flowmeters, and turns valves to regulate pumping speeds according to schedules. Turns handwheels to open line valves to direct flow of product. Signals PUMPMAN I; PUMPMAN HELPERS, and GAGERS (petrol. production; petrol. refin.; pipe lines) by telephone or radio to operate pumps in designated units, to open and close pipeline and tank valves, and to gage, sample, and determine temperature of tank contents. Records operating data, such as products and quantities pumped, stocks used, gaging results, and operating time. May blend oils and gasolines [BLENDER]. May repair pumps, lines, and auxiliary equipment.

PUMPMAN HELPER. pumper helper. Assists PUMPMAN I and PUMPMAN II in pumping crude semi-processed, and finished petroleum products, water, and chemical solutions through processing, storage, and shipping departments of refinery: Turns valves and switches to start and regulate operation of pumping units. Turns handwheels to open and close pipeline and tankage valves to direct flow of product to destination. Inspects pumps, lines, and tankage valves for leaks and malfunctioning. Lubricates valves and pumps. Tightens connections, using wrenches. Gages contents of tanks, using tape gage. Takes temperature readings by lowering thermometer into tank. Draws samples of product by lowering sample container into tank or by opening bleeder valves on pipelines to draw sample. Loads barges and tank cars. Performs other duties as described under HELPER.

SALVAGEMAN. salvage repairman; valve repairman, reclamation. Repairs defective valves and pipefittings removed from refinery pipelines, following specifications and using handtools and power tools: Clamps valve gage in vise. Grinds surfaces of valve gage to specified finish, using portable grinder. Cleans valve parts, using electric buffer and solvents. Verifies dimensions of valve parts, using calipers. Sends parts that require machining to machine shop. Orders new parts by catalog number, size, and type. Assembles and repacks valves, using handtools. Screws valve on testing device

and moves handle of hydraulic pump to test valve at specified pressures. Tightens bolts to stop leaks, using wrench. Removes flanges and pipefittings from pipe, using wrenches and acetylene cutting torch. Cleans flanges and fittings, using sandblasting equipment [SANDBLASTER (any ind.)]. Paints valves and fittings, using spray gun. Keeps inventory record of valves, flanges, and pipefittings by size and type. May recondition other refinery equipment, such as steam traps, water glasses, tubing, and condenser sections.

SALVAGE-MAN HELPER. salvage-repairman helper. Assists SALVAGE MAN in repairing defective valves and pipefittings removed from refinery pipelines: Dismantles valves, using wrenches. Rethreads pipefittings, using pipe threader. Sorts fittings according to type and size and places them in bins. Performs other duties as described under HELPER.

SAMPLER. laboratory sampleman; sample boy. Draws samples of petroleum products from various parts of refinery for laboratory analysts, using sample container: Samples contents of tank cars, processing units, stills, and pipelines by lowering sample bottle or metal container into contents at various depths, or by opening bleeder valves to release flow of products into containers. Collects samples taken by other workers. Pours samples from containers into sample bottles and ties identification tags to bottles or marks identifying information on them. Delivers sample to laboratory for analysis. May transmit messages between laboratory and processing units. May collect samples of other materials for laboratory analysis. May drive truck or jitney to gather samples.

STILLMAN. Analyzes specifications and controls continuous operation of petroleum refining and processing units to produce products, such as gasoline, kerosene, and fuel and lubricating oils, by such methods as distillation, absorption, extraction, absorption, thermal and catalytic cracking and reforming, polymerization, isomerization, coking, visbreaking, and alkylation: Reads processing schedules, operating logs, test results of oil samples, and laboratory recommendations to determine changes in equipment controls required to produce specified quantity and quality of product. Moves and sets controls, such as knobs, valves, switches, levers, and index arms on control panels to adjust, maintain, and coordinate process variables, such as flows, temperatures, pressures, vacuum, time, catalyst, and chemicals, by automatic regulation and remote control of processing units, such as heaters, furnaces, compressors, exchangers, reactors, quenchers, stabilizers, fractionators, rechargers, absorbers, strippers, debutanizers, stills, and towers [CONTROL MAN]. Moves controls to regulate valves, pumps, compressors, and auxiliary equipment to direct flow of product. Reads temperature and pressure gages and flowmeters, records readings, and compiles operating records. Determines malfunctioning units by observing control instruments, such as meters and gages, or by automatic warning signals,

such as lights and sounding of horns. Inspects equipment to determine location and nature of malfunction, such as leaks, breakages, and faulty valves. Determines need for schedules and performs repair and maintenance of equipment. Patrols unit to verify safe and efficient operating conditions. May sample liquids and gases [SAMPLER] and test products for chemical characteristics and color [TESTER]. May inspect and adjust furnaces, heaters, and damper controls. May lubricate equipment. May clean interior of processing units by circulating chemicals and solvents through them. May treat products [TREATER]. May control activities of several processing units operated in conjunction. May be designated according to process involved or plant operated as ABSORPTION-PLANT OPERATOR; PURIFICATION OPERATOR; STILLMAN, CRACKING UNIT; STILLMAN, POLYMERIZATION PLANT; STILLMAN, REFORMING UNIT; STILLMAN, VISBREAKING.

STILLMAN HELPER. Stillman, assistant. Assists STILLMAN in distillation and processing of crude and refined oil: Patrols area and inspects equipment, such as furnaces, distilling units, lines, and pumps to detect malfunctioning and leakage. Reads flow-meters and temperature and pressure gages and records data. Reports operating condition of units to STILLMAN. Turns valves and switches as directed to regulate temperature, pressure, and rate of flow of product; to direct flow of product to other units; to maintain specified levels of oil in tanks and towers; and to start, stop, and regulate equipment, such as pumps, compressors, and blowers. Draws samples of product from tanks and towers for laboratory testing. Tests oil samples to determine end point, specific gravity, boiling point, cloud point, and solubility, using laboratory and test equipment. Gages product in tanks and operates pumps and agitators to mix product or load it into storage tanks. Lubricates, cleans, and repairs equipment. May change recording charts and ink pens. May be designated according to type of processing unit or department as ABSORPTION-PLANT-OPERATOR, HELPER; PURIFICATION-OPERATOR HELPER; STILLMAN-HELPER, CRACKING UNIT; STILLMAN HELPER, CRUDE UNIT.

TANK CLEANER. Cleans interiors of boilers, storage tanks, kilns, and tank cars to remove emulsion and incrustations, using shovels, squeegees, brooms, scrapers, hoses, water, and solvents: Drains tank, connects hose to water or steam lines, and sprays walls, roof, and bottom of tank to flush oil, acid, and sludge through tank openings. Scrapes and scrubs walls, using detergents, solvents, scrapers, and brushes to remove incrustations, scale, or deposits of coke or catalyst. Sweeps up debris and shovels sludge into buckets and wheelbarrows or down chutes. Removes liquid from tank bottoms with squeegees or pump and suction hoses. May be designated according to type of tank cleaned as ACID-TANK CLEANER; TANK-CAR CLEANER.

TANK-TRUCK DRIVER. Drives tank truck to deliver gasoline, fuel oil, lubricating oil, or liquefied petroleum gas to customers: Drives truck into position to load at filling tank. Opens valves or starts pumps to fill tank. Reads gages or meters and records quantity loaded. Drives truck to premises. Connects hose to tank and opens valves. Records amount delivered and issues ticket to customer. May attach ground wire to truck. May be designated according to type of fuel delivered as **FUEL-OIL DELIVERY MAN:** **GAS-DELIVERY MAN:** May drive trailer truck and be designated **TRAILER-TANK TRUCK DRIVER.**

TEST-ENGINE EVALUATOR. research-test-engine evaluator. Collects and assists in evaluation of data obtained in testing petroleum fuels and lubricants under simulated operating conditions: Inspects engines after test runs have been made by **TEST-ENGINE OPERATOR**, for wear, deposits, and defective parts, using microscope and precision weighing and measuring devices to obtain accurate data. Records findings and assists in analyzing data. Assists in dismantling and reassembling engines during test runs. May obtain and analyze samples of engine-exhaust gas.

TESTER. crude tester; gas analyst; laboratory inspector; laboratory technician; laboratory tester; oil tester. Tests and analyzes samples of crude oil and petroleum products during processing stages, using laboratory apparatus and testing equipment, and following standard test procedures to determine physical and chemical properties and insure products meet quality control standards: Tests samples of crude and blended oils, gases, asphalts, and pressure distillates to determine characteristics, such as boiling, vapor, freeze, condensation, flash and aniline points, viscosity, specific gravity, penetration, doctor solution, distillation, and corrosion, using test and laboratory equipment, such as hydrometers, fractionators, fractional distillation apparatus, and analytical scales. Analyzes content of products to determine presence of gases, such as propane, iso-butane, butane, iso-pentane, and ethene, using Podbielniak distillation column and spinning band distillation column. Determines hydrocarbon composition of gasolines, blending stocks, and gases, using fractional distillation equipment and mass spectrometer. Operates a fractionation column to separate crude oil into oils with different boiling points to determine their properties. Analyzes composition of products to determine quantitative presence of gum, sulfur, aromatics, olefins, water, and sediment. Compares color of liquid product with charts to determine processing factors measurable by color. Compares test results with specifications and recommends processing changes to improve and control quality of product.

FUEL-RESEARCH ENGINE OPERATOR. knock-machine operator; motor tester. Determines, by actual motor performance, the knock intensity of gasoline and kerosene fuels, and the amount of lead tetraethyl necessary to raise fuels to required rating: Starts engine and allows it to warm up. Runs engine on sample fuel and

observes knock meter to determine knock intensity. Runs engine on two reference fuels for comparison. Adds lead tetraethyl to sample fuel until reading is same as reference fuels. Records knock intensity and octane rating of all fuel and amounts of tetraethyl added to sample fuel, submitting results to control laboratory. May maintain and overhaul laboratory knock-testing engines.

TEST-ENGINE OPERATOR. research-test-engine operator. Subjects petroleum fuels and lubricants to simulated operating conditions in full-scale test engines to obtain evaluating data: Runs tests with gasoline, diesel, aviation, and super-charged research test engines, dynameters, and other mechanical testing equipment, varying such factors as speed, temperature, load, fuel, and bearing, motor, or chassis lubricants as specified. Records horsepower ratings and other performance data. Tests fuels in standardized knock-rating test engines to obtain data for the determination of their octane or cetene values [FUEL-RESEARCH-ENGINE OPERATOR]. Adjusts and makes minor repairs to engine during test runs.

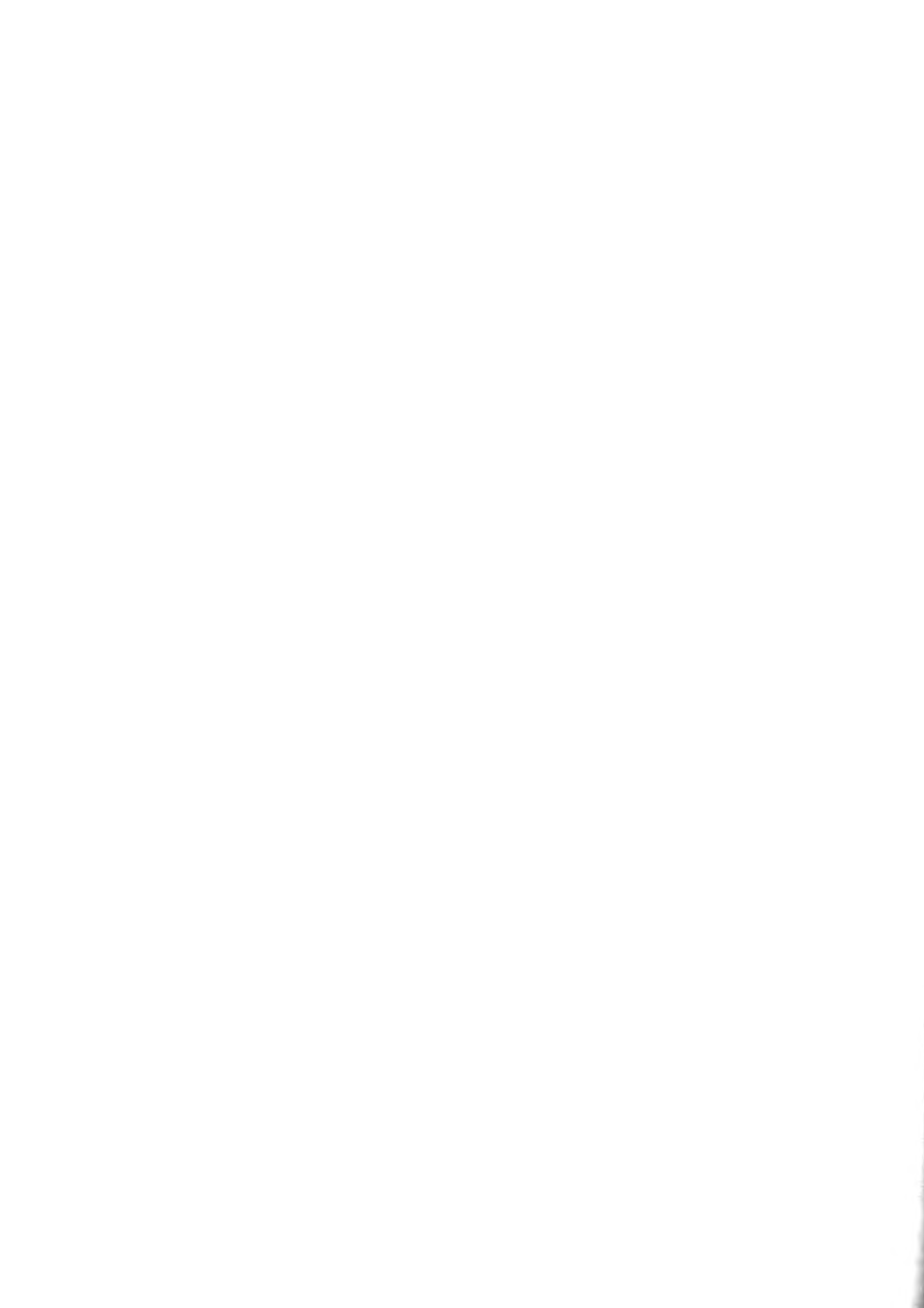
TITLE CLERK. Procures testimonial documents required to remove restrictions affecting title of landowners to property and requisitions purchase orders and bank checks to satisfy requirements of contracts and agreements covering lease or purchase of land and gas, oil, and mineral rights: Examines lease, contract, and purchase agreements to assure conformity to specified requirements. Examines abstract to assure complete title coverage of land described, completeness of land description, and to detect lapses of time in abstract coverage of landowner's title.

TREATER. Continuous unit treater, stillman; B-treating unit; treating-plant operator. Controls continuous or batch treating equipment to process petroleum products, such as gasoline, kerosene, and lubricating oils with chemicals, solvents, steam, clay, and hydrogen to remove impurities and to improve color, odor, and stability, according to specifications: Moves and sets levers and switches, dials, and handwheels to admit products and treating agents to processing units in specified ratio, to direct flow of products through treating stages, such as mixing, precipitating, and neutralizing, and to regulate temperatures, pressures, and circulation rates of treating equipment. Observes temperature, pressure, and flowmeters, records readings, and compiles operating records. Patrols unit to detect malfunctioning and leaks. Opens bleeder valves to sample products and tests them for chemical characteristics, specific gravity, and color, or sends sample to laboratory for analysis. Retreats products or pumps them to storage tanks, according to test results and laboratory recommendation. May add dyes or fortifying chemicals to product [BLENDER]. May be designated according to product treated as CRUDE OIL TREATER; WAX TREATER; treating agent used as ACID TREATER; HYDROGEN THEATER; plant operated as CLAY-PLANT TREATER; NAPHTHA PLANT TREATER; SOLVENT-PLANT TREATER; or type of operation as BATCH-UNIT TREATER.

TREATER HELPER. Assists TREATER in processing petroleum products, such as gasoline, kerosene, oils, and wax, with chemicals, steam, water, or air to remove impurities, such as sulfur: Examines pipelines and valves for leaks. Turns valves to charge equipment with product to be treated and to draw off water and spent chemicals after treatment and separation. Adds treating chemicals, such as sulfur and litharge, to product by turning valves or by dumping chemicals directly into equipment. May regulate pump speeds to control circulation of solution and product through unit. May gage tanks with calibrated rod or tape to determine quantity of content [GAGER]. May make chemical, specific gravity, and color tests of product and treating solution to determine process conditions. May draw samples of product for laboratory analysis. Performs other duties as described under HELPER.

TUBE CLEANER. Cleans scale from inside of tubes that are used in boilers, kilns, and stills to circulate hot air or water: Removes plugs or assemblies from tube ends, using handtools. Pushes compressed-air rotary scraper or wire brush through tubes to scrape scales from interior surfaces. Flushes or blows out loosened deposits, using water or air hose. May inspect tubes by drawing electric light through them. May be designated according to type of tube cleaned as STILL CLEANER, TUBE; TAR HEAT-EXCHANGER CLEANER.

WHARFINGER, HEAD. Directs departmental activities concerned with receipt and delivery of crude oil and petroleum products to and from tankers, barges, or ships, with storage of products in warehouses and tanks, and with maintenance of terminal facilities. Receives oil movement reports, and establishes procedures and schedules for receipt, storage, and delivery. Determines need for and availability of facilities, such as docks, storage tanks and pipelines, and consigns oil to vessels or storage tanks, according to types and quantities. Assigns vessels to berth and arranges for provisions of utilities, such as fresh water, steam, and electricity. Issues instructions, assigns personnel, and directs through subordinates activities involved in mooring boats, inspecting tanks, gaging and sampling oil, and loading and unloading crude oil and petroleum products. Enforces safety and immigration regulations and maintains order among ship and wharf personnel. Signs sailing release of vessels. Reviews receipt and delivery reports, and prepares correspondence relating to terminal activities. Schedules maintenance of terminal facilities.



DESCRIPTION OF MINING OCCUPATIONS*

AERIAL-TRAM OPERATOR. Tends aerial tramway (buckets attached to overhead cables and pulleys supported by towers) to convey refuse, coal, ore, and other materials from plant or mine to spoil pile, conveyor, railroad car, boat, or plant: Pushes buttons to start reel and winding cable, causing tram buckets to move between loading and dumping areas. Pulls levers to position buckets for loading and pushes button to dump load, or observes signal panel and listens for malfunction of automatic dumping equipment. Lubricates and repairs machinery. May remove or replace buckets.

AUGERMAN. carriage operator. Sets up and operates rotary auger drilling machine to mine coal from surface seams: Positions machine at seam, on skids, pontoons, or hydraulic jacks. Operates hydraulic equipment and moves levers to align auger with seam and to advance auger into seam, so that coal is cut and extracted for loading. Removes auger from seam when maximum penetration has been made and starts new hole.

BANK BOSS. Supervises and coordinates activities of workers operating machinery, such as front-end loaders, bulldozers, and conveyors, used in loading bank coal into trucks and railroad cars. Assists workers with faulty equipment. Performs duties as described under FOREMAN.

BIT-SHARPENER OPERATOR. bit grinder. Tends bit-sharpening machine to shape and sharpen detachable bits of mining equipment by one of the following methods: (1) Stacks dull bits in furnace and heats bits to specified temperature. Depresses pedal that causes furnace to eject heated bit. Positions bit in anvil slot of bit-sharpening machine, using tongs. Pushes foot lever to start machine and observes that bits are drawn into specified shape. Straightens crooked bits, using hammer. Stacks sharpened bits in annealing furnace. Removes heated bits and immerses in oil to temper, using tongs. (2) Inserts bits in holes of revolving drum and fastens them in place with wrench. Rotates drum to bring cutting edges of bits into contact with grinding wheels. Lubricates sharpening machine and changes worn grinding wheels, using handtools.

BLASTER. chargeman; chargeman, blasting; demolition man; dobie man; dynamiter; firer; powderman; shooter; shot firer; shot lighter. Determines pattern of explosions required and charges, tamps, and sets off explosives in underground or surface mine, pit, or quarry to break and loosen ore, coal, or rock from solid formations: Determines from rock formation amount and position of charge required, and type of blasting procedure to be followed. Inspects blasting area to insure that safety laws are observed. Inserts explosives,

*As defined in Dictionary of Occupational Titles, 1965, Vol. I.

such as dynamite cartridges and loose or bagged ammonium nitrate, into hole, and compacts charge by gently tamping it with a tamping rod. Positions primer in hole at depth where it will cause most effective explosion and attaches electric wire and blasting cap to primer. Covers charge with clay, rock dust, fine sand, or other material, and tamps material with wood rod to secure charge and prevent force of blast from shooting out of holes. Signals workers to clear blast area. Connects wires to electrical firing device, and pushes plunger or turns dial to set off single or multiple blasts. May work as member of blasting crew.

BOOM-CONVEYOR MAN. loader-head man; stacker attendant. Controls boom conveyors to move materials, such as coal and ore, to and from railroad cars and storage piles: Starts specified boom conveyor and conveyor belts, and adjusts height, swing, and extension of boom according to size of storage pile or position of car. Opens side gates of railroad cars to dump material onto conveyor that carries it to storage pile. Positions boom conveyor over railroad car and starts flow of materials from plant or storage pile to load car. Regulates conveyor speed to prevent spilling or weight variations among cars. Observes gages and lights on control panel to detect malfunctions of conveyor system. Diverts materials to storage bins or notifies plant or tipple operator to stop supply of materials during emergency.

BREAKER REPAIRMAN. mechanic. Lubricates, adjusts, repairs, and inspects machinery used to clean, crush, size, and otherwise prepare coal for commercial or industrial use, or for further processing. May be designated according to work station as BREAKER REPAIRMAN; PREPARATION-PLANT REPAIRMAN; TIPPLE REPAIRMAN.

CAR CLEANER. pit-car cleaner; rail-rail-road cleaner. Removes coal, dust, or other refuse from railroad or mine cars preparatory to loading: Opens pockets (bottom doors) and climbs into car. Shovels out refuse, and sweeps, scrapes, or flushes sides and bottom of car, using shovel, broom, and water hose. May control movement of cars [CAR DROPPER].

CARPENTER, MAINTENANCE. carpenter, repair; carpentry repairman. Constructs and repairs structural woodwork and equipment in an establishment, working them from blueprints, drawings, or oral instructions: Builds, repairs, and installs counters, cabinets, benches, partitions, floors, doors, building framework, and trim, using carpenter's handtools and power tools. Installs glass in windows, doors, and partitions. Replaces damaged ceiling tile, floor tile, and sheet plastic wall coverings. May build cabinets and other wooden equipment in carpenter shop, using woodworking machines, such as circular saw, bandsaw, and jointer. May be designated according to place at which work is performed as CARPENTER, BREAKER; CARPENTER, MINE; or according to specific items made or maintained as CARPENTER, CAR; FLUME MAN.

CHECK VIEWER. examiner; mine inspector; safety inspector. Inspects underground or open-pit mines to detect unsafe working conditions and violations of State and local mining regulations or contractual agreements: Looks for rotted or inco rectly placed timbers, dangerously placed or defective electrical and mechanical equipment, and improperly-stored explosives. Observes mine activities to detect violations of State and local mine-safety regulations. Inspects mine workings to verify compliance with contractual agreements concerning production rates and mining within specified limits. May instruct mine workers in safety and first aid. May be designated according to type of mine inspected as COAL-MINE INSPECTOR.

CHURN-DRILL OPERATOR. blast-hole driller; clipper-blast-drill operator; prospect-churn-drill operator; well-driller operator. Sets up and operates churn (cable) drilling rig to drill holes in rock or ground to secure samples for use in determining location and extent of mineral deposits: Positions drilling rig where specified, erects tower and pulley system, and hoists pipe (casing) into upright position for use in guiding drilling tool. Attaches drilling tool to cable and runs it through casing. Starts power unit. Moves levers to alternately raise and drop drilling tool to chip and shatter rock. Removes drilling tool from hole and dumps accumulated water and drillings. Replaces dull tools, lubricates, and makes minor repairs to equipment.

CHUTE LOADER. loader; railroad-car loader. Pulls levers to open and close chute of storage bin to load trucks, railroad cars, and conveyors with ore, coal, or rock. Lossens clogged material, using bar, compressed air, or by blasting. May position cars under chute [CAR DROPPER]. May spray water on materials to settle dust. May keep record of materials loaded. May pry and blast loose mined coal impounded behind batters (stop gate) of storage chute in steeply pitching seams, to load mine cars, and be designated BATTERY STARTER.

CLEANER. Cleans coal or coke from holds of ships, docks, or areas around chutes, conveyers, crushers, and screens, using airhose, brooms, scrapers, shovels, and wheelbarrow. May feed coal, using shovel and wheelbarrow, through crusher to obtain sample for laboratory analysis.

CLERK, GENERAL OFFICE. administrative clerk. Performs variety of following or similar clerical duties, utilizing knowledge of systems or procedures: Copies data and compiles records and reports. Tabulates and posts data in record books. Computes wages, taxes, premiums, commissions, and payments. Records orders for merchandise or service. Gives information to and interviews customers, claimants, employees, and sales personnel. Receives, counts, and pays out cash. Prepares, issues, and sends out receipts, bills, policies, invoices, statements, and checks. Prepares stock inventory. Adjusts complaints. Operates office machines, such as typewriter, adding, calculating, and duplicating machines. Opens and routes incoming mail, answers correspondence, and prepares outgoing mail.

May take dictation. May prepare payroll. May keep books. May purchase supplies. May be designated according to field of activity as COLLIERY CLERK.

COAL INSPECTOR. tipple inspector. Inspects coal at surface of mine, in trucks or railroad cars, at tipple, and at preparation plant, to maintain quality standards: Visually inspects samples to estimate percentage of impurities, such as rock and slate, and grades coal accordingly. Directs workers to remove trucks or cars to siding for thorough analysis of load. Rejects substandard coal. Records results of inspections. May supervise SAMPLERS.

COAL STRIPPER. A term applied to a worker engaged in mining coal in a strip mine. Classifications are made according to work performed on STRIPPING-SHOVEL OILER; STRIPPING-SHOVEL OPERATOR.

COAL WASHER. coal-washer tender; wash-box operator; wash-coal conveyorman; washer operator. Operates equipment to size and wash coal for shipment or further processing: Starts equipment such as launders, tables, shakers, sizing screens, and conveyors. Regulates flow of coal and water to separate coal from slate, rock, and other foreign materials and transfers cleaned and sized coal to loading chutes or storage. Observes equipment, gages, and indicator lights and adjusts equipment to insure maximum cleanliness of product. Lubricates and repairs equipment and replaces parts, using hand-tools. May test refuse samples to determine coal content, using scales to weigh material precipitated from samples by chemical reaction.

COMPANY LABORER. cleaner; company man; digger; laborer, mine; scraper; wasteman. Works in underground or surface mine, pit, or quarry, or at tipple, mill, or preparation plant, performing any combination of the following tasks: Cleans working areas and haulage tracks; digs and maintains drainage ditches; or shovels muck, ore, coal, or aside, into cars, or onto conveyors. Pushes loaded mine cars from working face to haulage road and couples them together for transportation to surface. Trims protrusions from walls and roofs of underground passageways and rooms. Strips (clean) residue of rock and dirt from exposed coal, ore, or rock formations. Loads, separates, or sorts materials at working face, using shovel or wheelbarrow. Throws calcium or salt around interiors of railroad cars to prevent coal or ore from freezing to cars during winter. May be known according to specific task performed as CAR SALTER; MUCKER I; SHOVELER; STRIPPER; TRIMMER.

CONE OPERATOR. cone tender. Tends cone gravity device to separate slate and rock from coal. Presses buttons to start conveyor and regulate flow of water into bottom of cone and maintain specified pressure to carry coal off with overflow while rock and slate fall to bottom. Pulls lever to open slate gate at bottom and draw off impurities.

CONTROL MAN. ore grader; quality control man. Coordinates loading, dumping, and blending of coal or ore at shipping dock, mill, tipple, or preparation plant: Studies schedules to ascertain required blends, grades, and sizes of material to be processed. Studies analysis sheets and selects materials which will meet specifications. Notifies workers to deliver specified cars for loading, designates loading sequence, and indicates whether cars are to be calked or plugged to retain powdered coal, oiled to reduce dust, or salted to prevent freezing. Notifies workers to load or dump materials. Prepares control sheet to record activities. Notes variances in product and requests corrective action.

CORE SPLITTER. Splits sample cores of mineral-bearing rock strata, removed from diamond core drill, for laboratory analysis, by one of the following methods: (1) Positions core on raised cutting bar or in grooved rail and splits core, using hammer and chisel. (2) Positions core in screw press and turns lever or handwheel until core splits. Tags half of core with origin of sample and forwards to laboratory for analysis. Stores other half of core until assay report is received.

DRAFTSMAN, MINE. Performs duties of a DRAFTSMAN I, but specializes in making drawings of mine machinery or structural features of mines from general design drawings or notes made by MINING ENGINEER. Makes graphic drawings of survey notes made by SURVEYOR.

DRIER OPERATOR. coal-drier operator, furnace operator; kiln operator. Controls one or more of several types of furnaces or kilns, and driers or auxilliary equipment to dry coal or ore before or after washing, milling, or pelletizing: Fires furnace or kiln, observes gages, and adjusts controls to maintain specified temperature. Starts conveyor that feeds materials into drying equipment. Observes operation to detect plugging of equipment, and dislodges material, using crowbar. Observes color of materials to determine moisture content, and adjusts temperature or drying time. Cleans and repairs equipment. May shovel in additives. May weigh and compare samples. May keep production records. May be required to hold fireman's license.

DUMP OPERATOR. boxcar unloader; car-dumper operator; tipple man. Tends mechanical or electrical dumping equipment to dump materials, such as grain, raw coal, or ore, from mine cars, railroad cars, or trucks into bins or onto conveyor for storage, reloading, or further processing by either of the following methods: (1) Observes that car or truck is spotted accurately on bed of rotary dump. Moves controls to secure clamps over couplings that hold car while being tipped. Starts motor or pulls lever that tips car and dumps contents. Releases clamps to remove car. (2) Opens bottom doors of car or truck spotted over gravity dump. Moves controls to lower car shakeout device into car and to start vibration that loosens remaining coal or ore. May hook winch cables to cars to draw them onto dumping bed. May couple and uncouple cars. May be designated according to type of equipment tended as CAR-SHAKEOUT OPERATOR; ROTARY-DUMP OPERATOR.

ELECTRICIAN. wireman. Plans layout and installs and repairs wiring, electrical fixture, apparatus, and control equipment: Plans new or modified installations to minimize waste of materials, provide access for future maintenance, and avoid unsightly, hazardous, and unreliable wiring, consistent with specifications and local electrical code. Prepares sketches showing location of all wiring and equipment or follows diagrams or blueprints prepared by others, insuring that concealed wiring is installed before completion of future walls, ceilings, and flooring. Measures, cuts, bends, threads, assembles, and installs electrical conduit, using such tools as hacksaw, pipe threader, and conduit bender. Pulls wiring through conduit, assisted by ELECTRICIAN HELPER. Splices wires by stripping insulation from terminal leads with knife or pliers, twisting or soldering wires together, and applying tape or terminal caps. Connects wiring to lighting fixtures and power equipment, using handtools. Installs control and distribution apparatus, such as switches, relays, and circuit-breaker panels, fastening them in place with screws or bolts, using drills, masonry chisels, hammer, anchor bolts, and wrench. Connects power cables to equipment, such as electric range or motor, and installs grounding leads. Tests continuity of circuit to insure electrical compatibility and safety of all components, using standard instruments, such as ohmmeter, battery, and buzzer and oscilloscope. Observes functioning of installed equipment or system to detect hazards and need for adjustments, relocation, or replacement. May repair faulty equipment or systems [ELECTRICAL REPAIRMAN]. May be required to hold license. May cut and weld steel structural members, using flame-cutting and welding equipment. May be designated according to work location as MINE ELECTRICIAN.

HEAVY-MEDIA OPERATOR. Tends gravity device to separate coal from refuse: Tests solution in tank for specific gravity, adds pulverized magnetite, and starts oscillating rake to maintain constant density. Opens chute gate to admit coal mixture to tank. Observes coal as it floats over wire onto conveyor. Opens gate to draw off refuse ✓ that was raked into discharge chute. Recovers magnetite, drawn off with coal and refuse, from filtering device, using shovel and wheelbarrow.

JIG RUNNER. jigman; jig tender. Tends battery of jigs used to separate slate from coal: Starts and stops conveyor to regulate flow of coal into jigs. Turns valves to control pulsating flow of water through screens in bottom of jigs or regulates speed of reciprocation (up-and-down motion) of screens or plunger to separate slate from coal.

LOADING-SHOVEL, OILER. benchman; oiler. Lubricates loading shovel at strip mine. Shovels dirt and coal to keep bench (top of exposed coal seam) clear, and keeps power cable clear of treads as shovel moves into position. Guides trucks into loading position.

MINE FOREMAN. general foreman. Supervises and coordinates activities of personnel, such as PIT FOREMAN; SECTION FOREMAN in one or more underground or surface mines, pits, or quarries: Supervises opening of new surface cuts or pits or underground rooms and passageways, or construction and installation of equipment as designated by MINE SUPERINTENDENT. Coordinates activities with those of SAFETY ENGINEER, MINES and reports safety violations. Inspects mines and instructs foreman to take necessary measures to improve production and working conditions.

MINE-MACHINERY MECHANIC. maintenance repairman, mine; mechanic; shovel-crane man. Repairs, adjusts, and maintains mining machinery, such as stripping and loading shovels, drilling and cutting machines, and continuous mining machines.

MINE SUPERINTENDENT. superintendent, colliery; superintendent, quarry. Plans and coordinates activities of personnel engaged in mining coal, ore, or rock at one or more underground or surface mines, pits, or quarries: Studies survey data and confers with engineering, maintenance, and supervisory personnel to plan development of mine. Calculates mining or quarrying costs, and instructs PIT FOREMAN to abandon or to open up sections, pits, and other working areas. Studies maps and blueprints to determine location for haulageways, roads, ventilation shafts, tracks, and conveyors. Studies land contours and rock formations, and specifies use of pillars, timbers, and roof bolts, and types of cutting, drilling, blasting, and loading equipment to be used. Studies mining laws and issues company regulations to insure their observance. Consolidates production reports and supervises activities of clerical personnel. Tours mine to detect and resolve safety, personnel, and production problems. Negotiates with workers, union personnel, and other interested parties to settle grievances.

MOTORMAN. dinkey operator; larry-car operator; trainman; trammer. Controls dinkey engine powered by electric, gasoline, steam, compressed air, or diesel engine to transport and shunt cars at industrial establishment or mine: Controls movement of dinkey that transports coal, rock, timber, slag, or supplies by moving power controls and brake levers. Signals BRAKEMAN by hand or whistle to couple cars. Positions cars for loading or unloading according to signals of DUMPER. Inspects engine at beginning and end of shift. May move levers to open or tilt cars to dump materials. May throw switches and couple cars. May fuel and lubricate engine.

OBSERVER, GRAVITY PROSPECTING. gravity-prospecting operator; recorder, gravity prospecting. Records readings of gravity meter, torsion balance, and other gravity-measuring instruments at various points in terrain to obtain potential source of metallic ore or petroleum deposits: Sets up or directs set-up of instruments at specified location and records readings. Examines readings for accurate registration and adjusts instruments to specifications. Reads thermometers, barometers, and other instruments and records variations in temperature, barometric pressure elevation, and other physical factors that affect instrument readings. May be designated

according to instrument used as GRAVITY-METER OBSERVER; MAGNETOMETER OPERATOR.

PANELBOARD OPERATOR. additive-plant operator; conveyor attendant; crusher operator; grinding-mill operator; mill attendant; washbox operator. Operates panelboard to control conveying, blending, washing, crushing, and sizing of coal, rock, or ore to prepare it for commercial or industrial use or for further processing: Pushes levers and buttons to start plant machinery. Studies customer orders or work schedules and adjusts controls to draw specified amounts and proportions of different grades of materials from storage bins onto conveyors, or operates equipment to dump material from cars. Observes dials and gages to route materials through series of screens, wash boxes, crushers, and driers. Reads ammeters to determine load on conveyors and regulates loads to adjust blends. Observes panel lights and meters for indication of overloads, malfunctions, or plugged chutes, and shuts down plant, reroutes materials, or adjusts controls to regulate feed. Notifies maintenance and loading personnel of delays or malfunctions. Observes operation to determine that refuse and tailings are removed as specified.

PIT FOREMAN. dimension-quarry foreman; strip-mine foreman. Supervises and coordinates activities of workers engaged in strip or pit mining or in quarrying: Studies contour maps and aerial photographs to determine locations for roads and cuts. Supervises road construction crew and lays out blast pattern. Supervises drilling and shooting crews in drilling blast holes and detonation of charges. Plans location of spoil pile (dump area) to allow maximum room for stripping. Coordinates stripping, drilling, blasting, quarrying, and loading activities, and assists workers with faulty equipment. Determines property lines and legal limits of operations in order to comply with rights of adjoining property owners and mining laws. Schedules running and major repair work on drilling machine and stripping and loading shovels. Requisitions supplies, such as explosives, lubricants, bits and machine parts. Observes mining operation to detect violation of safety regulations and completes safety and production records. May supervise crushing operations. May train new workers. Performs other duties as described under FOREMAN.

POWER-SHOVEL OPERATOR. shovelman; shovel operator. Operates power-driven machine equipped with moveable shovel, to excavate and move coal, dirt, rock, sand, and other materials: Pushes levers and pedals to move machine, to lower and crowd dipper into material, and to lift, swing, and dump contents of dipper into truck, car, or onto conveyor or stock pile. May operate power shovel equipped with duck bill scoop (round nosed) and be designated DUCK-BILL OPERATOR. May operate power shovel which digs by pulling dipper toward machine and be designated BACK-HOE OPERATOR. May operate power shovel on which excavating bucket runs outward along horizontal boom to dig into materials and be designated SKIMMER-SCOOP OPERATOR. May

operate power shovel designed to be converted to crane, skimmer, scoop, backhoe, or dragline and be designated CONVERTIBLE-POWER-SHOVEL OPERATOR.

PULLEYMAN. rollerman; wheelman. Oils, greases, and replaces idler rollers or pulleys which support cable used in mine haulage slope. Oils and greases cable.

SAMPLER. buckler; coal inspector; hardness tester; ore sampler; tester. Removes samples of coal or ore from railroad cars, conveyors, or various stations in mine to facilitate grading and blending, or for laboratory analysis: Gathers samples from specified locations. Dumps materials into grinding machine that blends and grinds sample, or bags portion of each sample. Segregates samples into specified sizes by feeding material onto vibrating screens. Weighs segregated materials separately, and computes percentage of each in total samples. May perform chemical sedimentation or magnetic separation tests. May dry samples in oven. May perform hardness test on pellets. May plot origin of samples on mine map.

PREPARATION PLANT FOREMAN. breaker boss; tippie foreman; washery boss. Supervises and coordinates activities of workers engaged in crushing, sizing, cleaning, treating or loading coal at tippie or preparation plant, performing any combination of the following tasks: Receives daily reports of quantity and grade of materials to be loaded into railroad cars or trucks. Transmits loading orders to equipment operators and loading crew. Observes activities of workers to insure that impurities and materials of unspecified size are extracted from picking tables or conveyors. Directs operation of crushers, pumps, and furnaces, and assists workers with faulty equipment. Inspects equipment for processing and loading materials and schedules maintenance. Computes daily production from weight of loaded cars or trucks. Performs other duties as described under FOREMAN.

SHAKER TENDER. screenman. Tends shaker (vibrating or reciprocating screen) that sizes crushed coal, ore, or rock for industrial use or for further processing. Opens and closes chute gates to regulate flow of materials onto shaker table. Picks out refuse and impurities. Unclogs conveyors and screens, and shovels spillage onto conveyors or screens. May change screens.

SLATE PICKER. bone picker; coal cleaner; lump picker; picking-table man; plateman; platform man; rock picker; scalper. Removes lumps of coal, bony coal (coal high in slate content), or impurities, such as slate, rock, and sulfur, from run-of-mine coal as it passes by on conveyor, picking table, or shaking screen. Throws lump coal and bony coal into bins for further processing. Routes impurities to dump.

SPIRAL RUNNER. Tends battery of spirals (mechanical devices that separate slate from fine coal by centrifugal force): Starts equipment and opens feed lines admitting material into spirals. Examines samples and regulates spirals so that too much slack (fine coal) does not go into refuse.

SPRINKLER. Sprays or sprinkles water on dry coal or dust in mine to cause dust to settle to reduce hazard of explosions, using hand sprinkler, sprayer, or water hose. Records sections of mine sprinkled.

STRIPPING-SHOVEL OPERATOR. Operates specially-constructed stripping shovel to remove overburden at strip mine or open pit preparatory to actual mining operations: Moves levers and pedals to scoop up blast-loosened dirt and rock from top of coal, ore, or rock seam and to deposit it in void left by preceding strip. Piles heavy rock at base and lighter materials on top to build spoil pile that will not shift down onto workmen. Signals **BULLDOZER OPERATOR I** to scrape scattered rock and dirt into pile within reach of shovel. May repair and replace shovel parts, such as gears, bearings, and bucket teeth, using handtools.

SURVEYOR. chief of party; party chief. Surveys earth's surface and oversees engineering survey party engaged in determining exact location and measurements of points, elevations, lines, areas, and contours of earth's surface to secure data used for construction, mapmaking, land valuation, mining, or other purposes: Calculates information needed to conduct survey from notes, maps, deeds, or other records. Keeps accurate notes, records, and sketches of work performed or data secured. Surveys earth's surface, using surveying instruments and verifies by calculations accuracy of survey data secured. Adjusts or directs **INSTRUMENT MAN** in adjusting surveying instruments to maintain accuracy.

SURVEYOR, DEPUTY. surveyor, mineral. Surveys and marks boundaries of mines, and drafts and files maps with district U.S. Land Office to establish patents or mining claims. Must hold permit from General Land Office.

SURVEYOR, MINE. Conducts surface and underground surveys at coal or ore mines to control direction and extent of mining: Takes instrument readings of sun or stars and calculates longitude and latitude to determine mine location. Directs **CHAIRMAN** to suspend plumb bobs from surface to shaft bottom to extend surveys lines underground, using suspended bobs as survey points. Computes data necessary for driving and connecting underground passages to control direction and extent of mining operation. Computes volume of coal or ore in portions of mine, using survey notes. Surveys and calculates volume of material in dumps, spoil piles, or veins, and amount of overburden to be removed. Drafts maps of mine workings.

TIPPLE MAN. A term applied to worker who works in tipple at face of mine.

TRACK-MOVING-MACHINE OPERATOR. hydraulic-jack operator; track-laying-machine operator. Operates vehicle that automatically moves and lays track in open-pit mine: Drives vehicle over section of track to be moved. Pushes control to close grasping device on track section, raise section, and move it to specified location. Engages mechanism that lays track to specified gage.

APPENDIX C

Schools With Programs Related to Coal Gasification

APPENDIX C

SCHOOLS WITH PROGRAMS RELATED TO COAL GASIFICATION

The following list contains, by State, the names, locations and programs of post-secondary schools which offer course work that is related to jobs in coal gasification. The listing may be somewhat incorrect as it was prepared in 1971. These schools would be the ones most likely to be amenable to incorporating coal gasification subjects into their curriculum.

MONTANA

PROGRAM

Billings Vocational Technical
Center, 219 N. 25th Street,
Billings, Montana 59101

Public Vocational

Bozeman Vocational Technical
School, Box 520, Willson
School, Bozeman, Montana 59715

Public Vocational

Butte Vocational Technical
Center, 404 S. Wyoming St.,
Butte, Montana 59701

Public Vocational

Great Falls Vocational
Technical Center,
P.O. Box 2669
Great Falls, Montana 59401

Public Vocational

Northern Montana College
Havre, Montana 59501

Mech. Tech.; Chem. Tech.;
Auto Tech.; Diesel Mech.;
Electron Tec., Elec-Mech.;
Construction; Agri. Tech.;
Secretary; Pers. Ser. Tec.

Helena Vocational Technical
Center, 1115 Roberts Street,
Helena, Montana 59601

Public Vocational

Flathead Valley Community
College, P.O. Box 1174
Kalispell, Montana 59901

Auto Tech.; Forest Tech.;
Market Tech.; Secretary

MONTANA (Cont'd)

Miles Community College
2715 Dickinson Street
Miles City, Montana 59301

Missoula Vocational
Technical Center
989 South Avenue West
Missoula, Montana 59801

NEBRASKA

Central Nebraska Technical
College, P.O. Box 1024
Hastings, Nebraska 68901

Lincoln Technical College
720 S. 22nd Street
Lincoln, Nebraska 68501

Nebraska Farrier School
Route 1
Lincoln, Nebraska 68502

Union College
Lincoln, Nebraska 68506

Nebraska Vocational -
Technical College
Milford, Nebraska 68405

PROGRAM

Arch. Draft.; Auto. Tech.;
Electronic Tec.; Secretary

Public Vocational

Data Process.; Engr. Graph.;
Arch. Draft.; Auto. Tech.;
Diesel Mech.; Welding Tech.;
Civil Tech.; Electron. Tec.;
Construction; Agri. Tech.;
Bus/Comm.; Market. Tech.

Envir. Health; Accounting,
Bus. Data Pro.; Gen. Office;
Personnel, Secretary, Sup/Adm.
Mgt.; Typing, Arch. Tech.;
Auto. Tech.; Electron. Tec.;
Envir. Cntrl.; Mech. Tech.;
Fire Tech.; A/C Repair; Auto
Mech.; Blueprint.; Bus. Mach.
Rep.; Elec. Constr.; Plumbing;
Custodial, Drafting, Electron.
Occ.; Engine Rep.

Metalworking

Auto. Tech.; Electron. Tec.;
Food Ser. Tec.; Secretary

Bus. Data Pro.; Arch. Tech.;
Civil Tech.; Elec. Tech.;
Electron. Tech.; Ind. Tech.;
Mech. Tech.; Fire Tech.;
A/C Repair; Auto Repair; Auto
Mech.; Carpentry; Elec. Constr.;
Construction; Diesel Mech.;
Electron. Occ.; Foremanship;
Metalworking, Plastics, Wood-
working

NEBRASKA (Cont'd)

Northeast Nebraska Technical
College, East Benjamin Ave.,
Norfolk, Nebraska 68701

Mid-Plains Vocational-
Technical College
North Platte, Nebraska 69101

Omaha Technical College
3902 Davenport Street
Omaha, Nebraska 68131

Opportunities Industrial
Center, 2802 N. 24th Street,
Omaha, Nebraska 68110

Universal Technical Institute
902 Capitol Avenue
Omaha, Nebraska 68102

University of Nebraska
Omaha, Nebraska 68101

Western Nebraska Technical
College, Sidney, Nebraska
69162

PROGRAM

Accounting; Bus. Data Pro.;
Secretary; Typing; A/C Repair;
Appli. Rep.; Auto. Repair;
Auto. Mech.; Carpentry; Custo-
dial; Diesel Mech.; Drafting;
Electron. Occ.; Metalworking

Bus. Data Pro.; Gen. Office;
Arch. Tech.; Electron. Tec.;
Mech. Tech.; A/C Repair; Appli.
Rep., Auto Mech.; Auto Spec.;
Blueprint; Carpentry; Masonry;
Drywall; Roofing; Diesel Mech.;
Drafting, Elec. Occs. Electron.
Occ.; Metalworking; Refrig. Eng.;
Engine Rep.; Upholstering,
Trades Misc.

Transpo. Serv.; Accounting,
Gen. Office; Secretary; Sup/Adm.
Mgt.; Typing; Auto Repair; Auto
Mech.; Constr. Equip.; Masonry;
Plumbing; Drywall; Glazing;
Construction; Custodial; Draft-
ing; Elec. Occs.; Electron. Occ.;
Graphic Arts; Metalworking;
Engine Rep.; Sta. Engr.

Trade (Independent)

Auto Sales; Auto Tech.; A/C
Repair; Auto Repair; Auto Mech.;
Refrig. Engr.

Arch. Draft.; Electron. Tec.;
Ind. Tech.; Construction;
Secretary; Police Sci.

Arch. Tech.; Electron. Tec.;
Auto Repair; Auto Mech.;
Aircraft Maint.; Aircraft Opns.;
Blueprint; Carpentry; Elec.
Constr.; Constr. Equip.; Diesel
Mech.; Drafting; Electron. Occ.;
Metalworking; Upholstering

NORTH DAKOTA

Lake Region Junior College
Fourth Avenue & Seventh Street
Devils Lake, North Dakota 58301

Evaluation & Training Center
424 Ninth Avenue South
Fargo, North Dakota 58102

Hanson Mechanical Trade School
65 North Third Street
Fargo, North Dakota 58102

North Dakota State School
of Science, 800 N. Sixth St.,
Wahpeton, N. Dakota

University of North Dakota
Williston, N. Dakota 58801

SOUTH DAKOTA

South Dakota State University
Brookings, S. Dakota 57706

Mitchell Area Vocational-
Technical School
821 N. Capital Street
Mitchell, S. Dakota 57301

Black Hills Area Vocational-
Technical School
1200 - 44th Street
Rapid City, S. Dakota

Southeast Area Vocational-
Technical School
1401 E. 35th Street
Sioux Falls, S. Dakota 57104

University of South Dakota
at Springfield
Springfield, S. Dakota 57062

PROGRAM

Arch. Draft.; Auto Tech.;
Welding Tech.; Civil Tech.;
Construction; Agri. Tech.;
Market. Tech.

Public - Other

A/C Repair; Auto. Repair;
Auto Mech.; Auto Spec.;
Auto Serv.; Diesel Mech.

Data Process.; Comp. Prog.;
Comp. Opr.; Engr. Graph.;
Arch. Draft.; Auto Tech.;
Diesel Mech.; Welding Tech.;
Civil Tech.; Electron. Tec.;
Mech. Tech.; Construction,
Accounting; Market. Tech.

Auto Tech.; Diesel Mech.;
Welding Tech.; Construction

Arch. Draft.; Civil Tech.;
Agri. Tech.; Secretar

Auto Tech.; Elec. Tech.;
Electron. Tec.; Auto Mech.;
Blueprint; Carpentry; Elec.
Constr.; Diesel Mech.;
Drafting; Elec. Occs.;
Electron. Occ.; Trades Misc.

Electron. Tec.

Elec. Tech.; Appli. Rep.;
Auto Mech.; Diesel Mech.;
Drafting

Engr. Graph.; Arch. Draft.;
Auto Tech.; Diesel Mech.;
Electron. Tec.; Construction

SOUTH DAKOTA (Cont'd)

Golden Leaf Farrier College
Box 195
Sturgis, South Dakota 57785

Sturgis Area Vocational School
Sturgis, South Dakota 57785

Lake Area Vocational-
Technical School
230 11th Street, N.E.
Watertown, S. Dakota 57201

WYOMING

Casper College
125 College Drive
Casper, Wyoming 82601

Laramie County Community
College, 1400 E. College Drive
Cheyenne, Wyoming 82001

Northwest Community College
Powell, Wyoming 82435

Central Wyoming College
Riverton, Wyoming 82501

Western Wyoming Community
College, 2500 College Drive,
Rock Springs, Wyoming 82901

Sheridan College
Sheridan, Wyoming 82801

Technical College of the
Rockies, 7th & Broadway
Thermopolis, Wyoming 82443

PROGRAM

Trade - Proprietary

Gen. Office; Typing; Office
Misc.; Electron. Tec.;
Carpentry; Construction

Electron. Tec.; Auto Mech.;
Carpentry; Diesel Mech.;
Drafting; Electron. Occ.;
Metalworking

Comp. Opr.; Engr. Graph.;
Auto Tech.; Electron. Tec.;
Ind. Tech.; Construction;
Agri. Tech.; Accounting;
Secretary

Auto. Tech.; Welding Tech.
Secretary

Data Process.; Welding Tech.;
Secretary; Printing

Comp. Prog.; Engr. Graph.;
Electron. Tec.; Bus/Comm.;
Secretary

Ind. Tech., Secretary

Mech. Tech.; Ind. Tech.; Bus./
Comm.; Accounting; Secretary

Accounting, Bus. Data Pro.; Gen
Office; Secretary; Typing;
Auto Tech.; Mech. Tech.;
Bus/Comm.; Tech. Ed. Misc.;
Auto Repair; Auto Mech.; Auto
Spec.; Auto Serv.; Diesel Mech.;
Drafting; Graphic Arts; Trades
Misc.

APPENDIX D

Energy Development Training - Casper College

APPENDIX D

CASPER COLLEGE DIVISION OF TRADES & INDUSTRY

VOCATIONAL TRAINING FOR WYOMING ENERGY DEVELOPMENTS

STATUS REPORT
MARCH 1974

At the present time Casper College is heavily committed to the training of the workers for the emerging energy developments in Wyoming. This commitment dates back to the founding of the school in 1945 to serve the needs of this part of Wyoming. From this beginning Casper College has worked closely with the community and Wyoming industry to provide the training needed for a skilled work force.

Present programs of interest are the related training for indentured apprentices in Carpentry, Electrician, Plumbing, Pipefitting, Utility Lineman, Sheetmetal, and Ironworkers. These programs are conducted both in the classroom and by correspondence due to the scattered population of Wyoming. This is the classroom work that relates the theory to the actual on the job training. This is a state wide program.

On campus regular programs of study presently include Automotive Service & Repair, Drafting, Electronic Engineering Technology, Petroleum Engineering Technology, Machine Shop, and Welding (including pipe welding.) Most of these programs have an advisory committee of personnel in industry to guide to course to their needs.

Special programs have been a part of Casper College for several years. In 1972 the college ran a special one time program to train 60 employees for the Highland Uranium Mine & Mill for Exxon Company USA. Casper College is now finishing a program of Plant Maintenance Mechanic for the Pacific Power & Light Company, training personnel for their new coal-electric power plants. Incidentally, this program was operated off campus at their Dave Johnston Plant in Glenrock. An Electrician-Instrumentation program is now in progress to train these personnel for the Texaco and Little America (local independent) refineries. A special welding program is operating for personnel of the American Oil Company refinery for their expansion program.

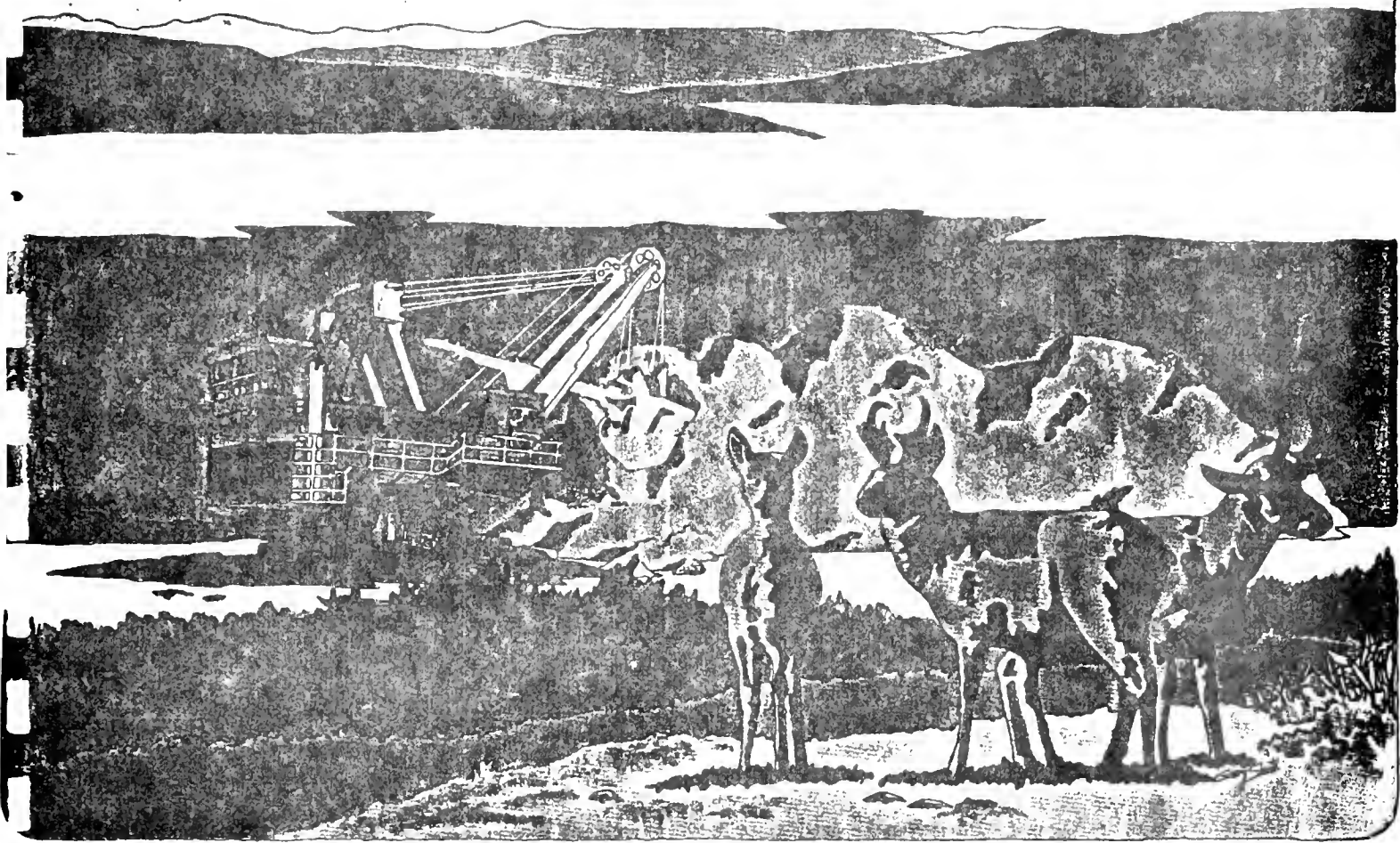
In the future are a training program for Coal Field Technicians set up with the Carter Oil Co. (Exxon) for electricians and mechanics. This program will start in the fall of 1974. Carter Oil Co. is providing 30 scholarships in addition to general aid. Somewhat unique

to this program is a special course in Wyoming Studies that will aid the trainees in adjusting to the living problems that will develop in the boom towns where they will be employed. Carter Oil Co. has also indicated they would like a cooperative program also for coal gassification plant employees within the next several years. This program is currently under study. Also underway is a study with the Operating Engineers Union for a training program for heavy equipment operators. A consortium of equipment dealers, mine operators, and construction companies has requested Casper College to start a program in Diesel-Heavy Equipment Mechanic as soon as possible. If funding can be found, and the industry will provide part, this program will start in the fall of 1974.

Casper College is undergoing a physical plant expansion. The new Myra Fox Skelton Energy Institute will house an expanded Petroleum Technology, Geology, and Drafting programs. An addition to the shop facilities is under construction to provide more space for welding, machine shops, and mechanics. (At present the shops are used seven days and six nights a week to serve the training needs of the community.)

The key to the success of the industrial education programs is twofold. First, most of the faculty have an industrial background with Wyoming industry. It is not just theory and teaching philosophy, but actual industrial experience that counts in this training area. Second, the industry advisory committees keep the programs on course to provide the job skills that are needed in Wyoming.

Coal Field Technology



The Carter Oil Co. – Casper College
Cooperative Training Program
for Coal Field Employees

Jobs Available. . .

- **HEAVY EQUIPMENT OPERATORS. . .**
...driving trucks, dozers, scraper-graders, shovels or draglines.
- **ELECTRICIANS. . .**
...installing, maintaining and repairing electrical systems and equipment.
- **MECHANICS. . .**
...maintaining and repairing plant and operating equipment.

How Much Will You Earn. . .

Competitive rates will be paid at the time students successfully complete this program and it is now estimated that in early 1976 the salary rate will be approximately \$300.00 a month for a regular 40 hour week. A benefit plan — one of the best in the country — will include hospital, surgical and medical coverage, retirement income, and a savings investment plan.

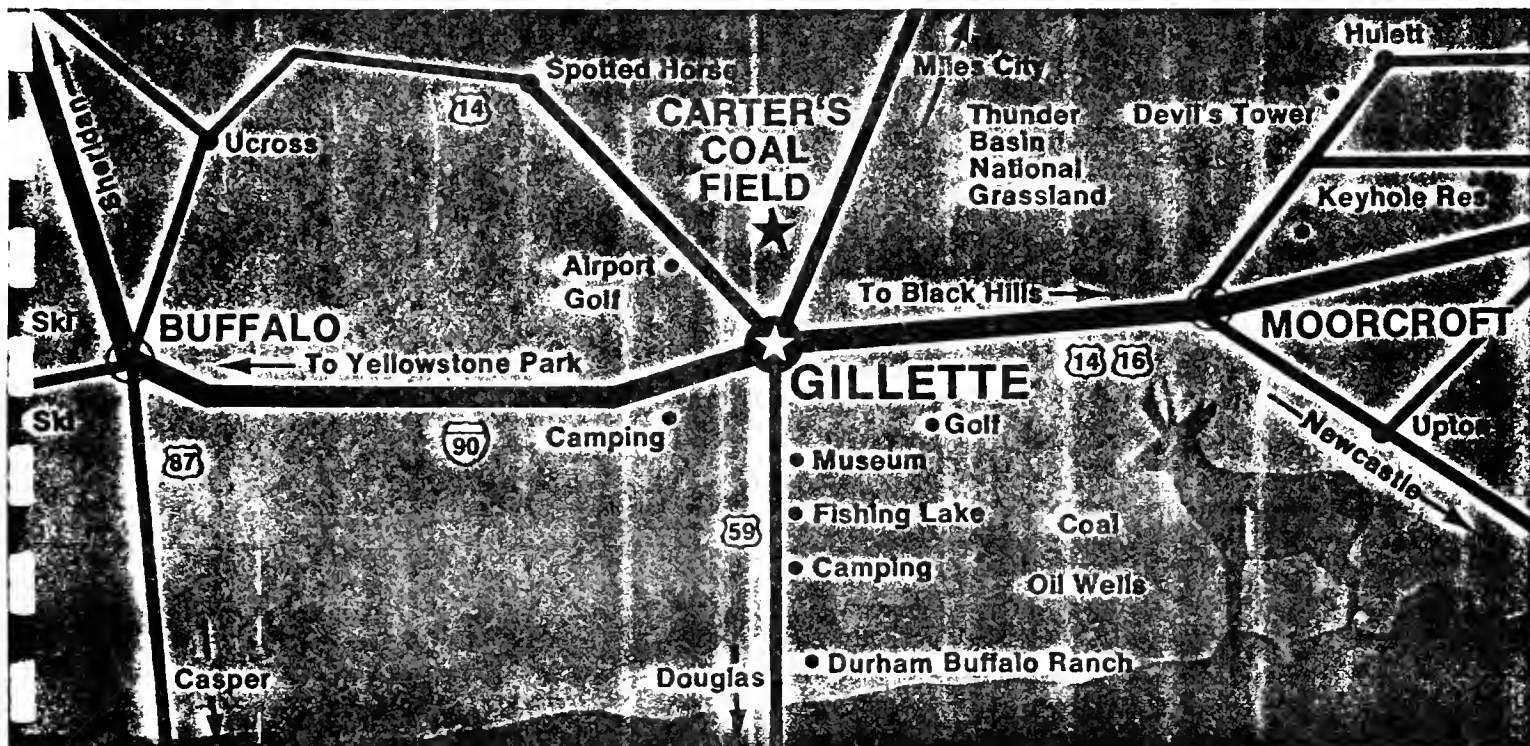
Initial Western coal development efforts focus on tracts near Gillette, Wyoming.

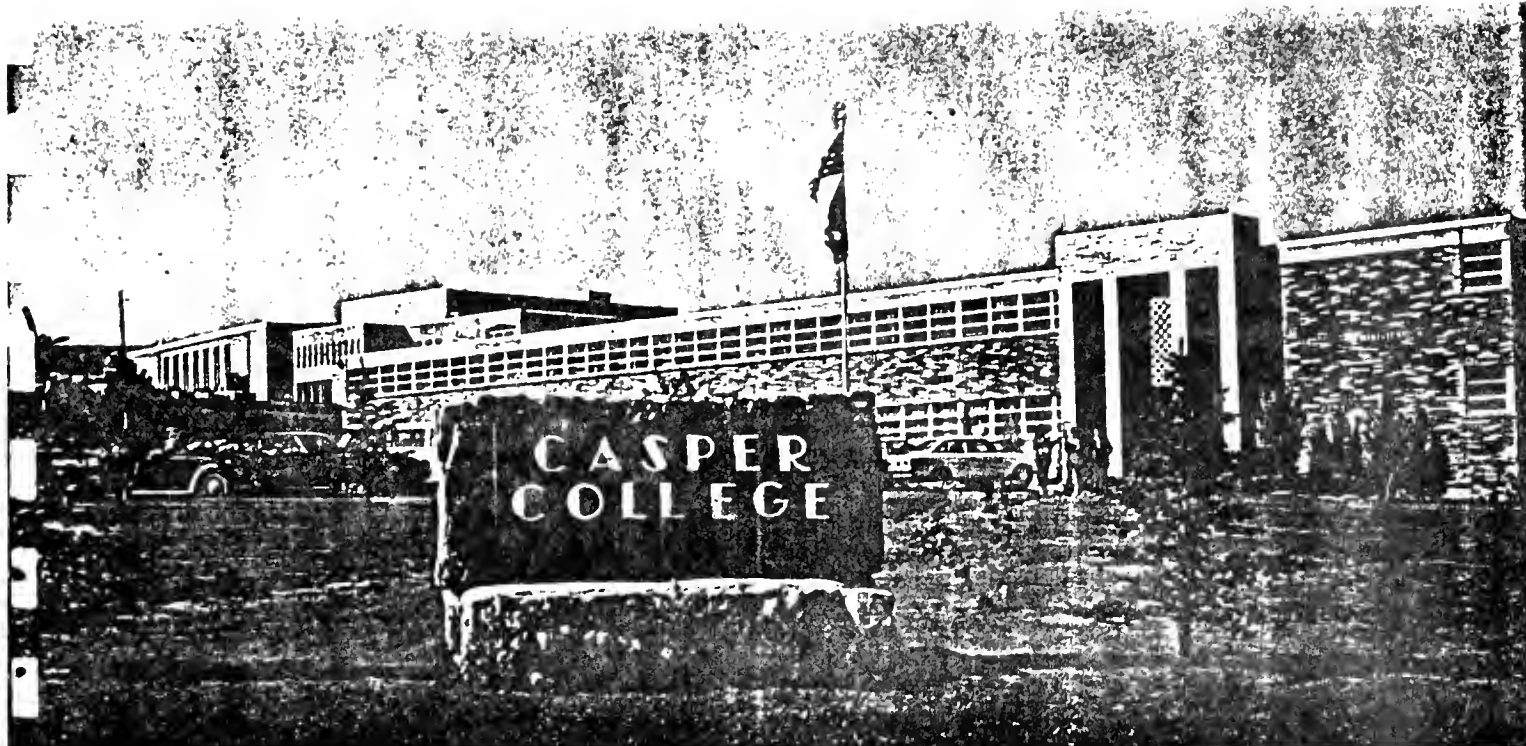
Equal Opportunity Employment Policy

It is the policy of The Carter Oil Company to afford equal opportunity to qualified individuals regardless of their race, color, religion, national origin, age, or sex, and to conform to applicable laws and regulations. This policy of equal opportunity also provides for taking affirmative action in all aspects of the employment relationship including recruitment, hiring, upgrading, transfer, termination, wage and salary administration.

How To Qualify:

This is a cooperative training project between The Carter Oil Company and Casper College. Application is through Casper College. Scholarship winners will receive tuition, books, and part of living expenses for out-of-town students at the college facilities. This is an Associate of Applied Science Degree program.





Course Work

FIRST YEAR

<i>Industrial Communication</i>	<i>Beginning Welding</i>
<i>Wyoming Studies I</i>	<i>Machine Shop I</i>
<i>Technical Mathematics</i>	<i>Wyoming Studies II</i>
<i>Drafting</i>	<i>Technician Physics</i>
<i>Basic Mechanics</i>	<i>Basic Electricity</i>
<i>Summer employment with The Carter Oil Company</i>	

SECOND YEAR

<i>I. Electrician</i>	<i>II. Mechanic</i>
<i>Industrial Communication II</i>	<i>Industrial Communication II</i>
<i>Basic Electronics II</i>	<i>Heavy Equipment Maintenance</i>
<i>Electric Power</i>	
<i>Automotive Electricity</i>	

About Casper College:

Casper College is a comprehensive, two-year, community college which offers programs both for those who want to continue their college elsewhere and for those who want to be prepared for employment in one or two years.

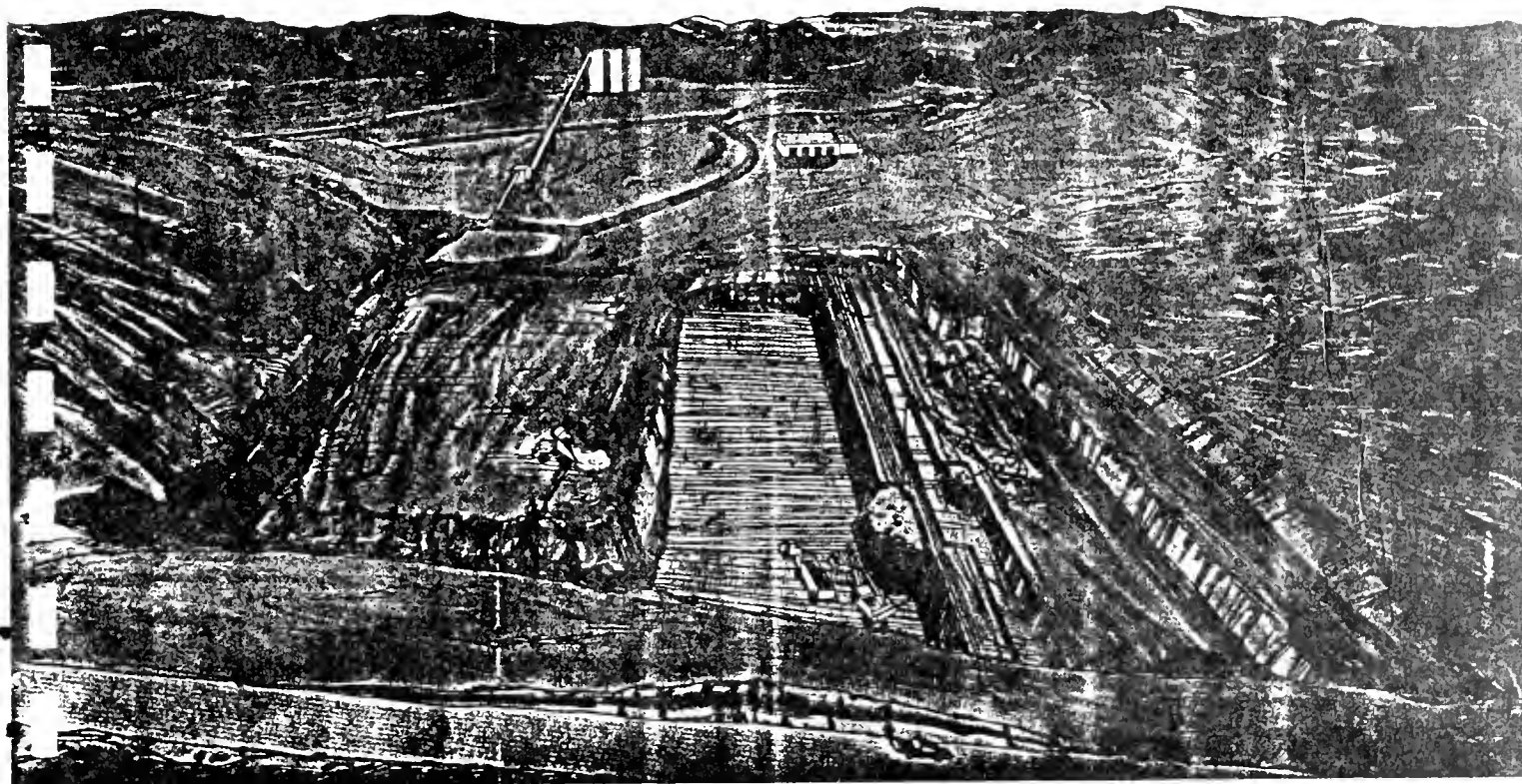
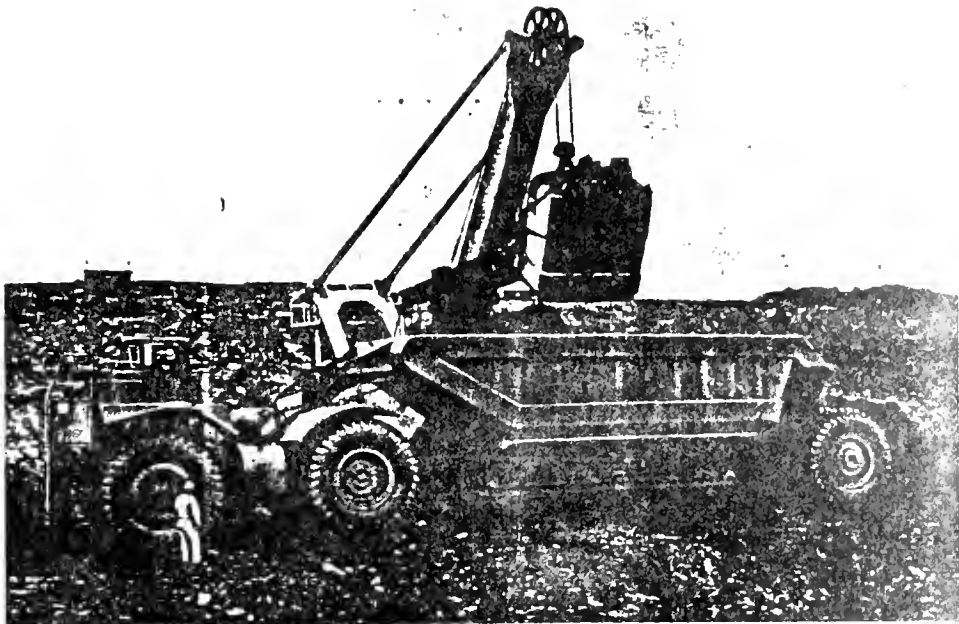
The college is the oldest and largest in the state, with a large campus including housing for single and married students. Enrollment during the past few years has varied between 1400 and 1800 full-time students.

The town in which the college is located provides many job opportunities for students who want work; normally two-thirds of the college's students hold jobs in the community. The central location makes commuting home on weekends convenient for any student in the state.

Recreation is as near as Hogadon Basin, a ski area on Casper Mountain that can be seen from the campus. The college maintains a varied extra-curricular activities program in sports and entertainment during the academic week and on weekends.

The Carter Oil Company

The Carter Oil Company is an Exxon affiliate engaged in the acquisition and development of coal reserves. Initial West-
e production will be from coal seams underlying tracts in the vicinity of Gillette, in northeastern Wyoming. Initial contracts assure that operations will be conducted in the area for 30 years or more, and plans are being made to assure that the stay is a pleasant one, for employees and for the community.



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